Products & Solutions Catalog 2015

RAISECOM
www.raisecom.com

About Raisecom

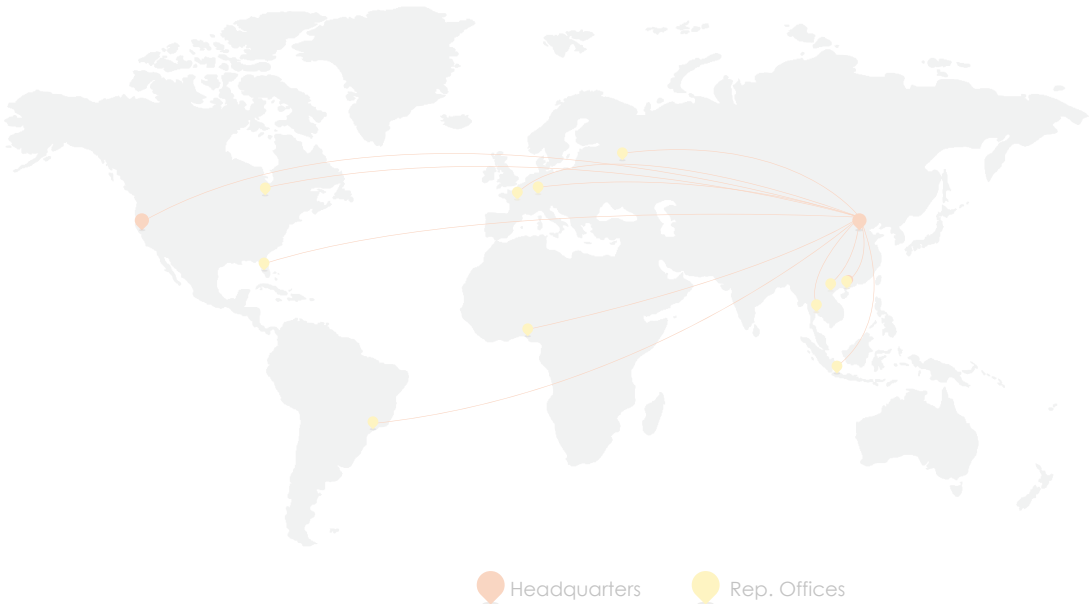
Raisecom, established in 1999, is now a leading vendor providing comprehensive access solutions and network devices. Headquartered in Beijing/China, Raisecom has consistently achieved strong growth with partners and customers over 80 countries worldwide.

Raisecom has over 2,500 employees with one RnD center in Beijing, two main manufacturing sites in Beijing and Shenzhen, more than ten international representative offices and two international branches, Raisecom Brazil Branch at Sao Paulo and Raisecom Inc. located in Florida, USA.

Starting from innovative Ethernet media converters, Raisecom has developed a number of product lines including Carrier Ethernet, SME Router, Industrial Switch, xPON, PTN, Ethernet over Everything, Last Mile Access, MSAP and NMS. In addition, we specialize in tailored solutions for access scenarios focusing on business connections, SME access, Mobile Backhaul (MBH) and Fronthaul, Industrial, Utilities and Transportation applications and Broadband Access.

Raisecom is ISO9001:2008 certified for RnD, manufacturing, technical support and marketing. Our products are compliant with CE, RoHS, IEEE, IEC, UL and CSA standards and regulatory. Raisecom is a member of MEF, BREKO and Syncworld ecosystem. We also participate and sponsor top-level industry exhibitions, conferences and forums. The company has been recognized as "Advanced Energy-saving Enterprise of Telecommunication in China" and one of the "Top 10 Competitiveness Enterprises in the Optical Transmission and Network Access Equipment Field of China".

We are also among the market-leading Carrier Ethernet manufacturers, and received prestige awards from global organizations like IIR and MEF.



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Business Connections for Corporate Users and Government

Raisecom business solutions present a comprehensive range of access solutions and technologies, servicing large enterprises, financial institutions, government bodies, educational organizations, health centers, and other public establishments, where mission-critical tasks as well as conventional data communication are delivered, and processed quickly.

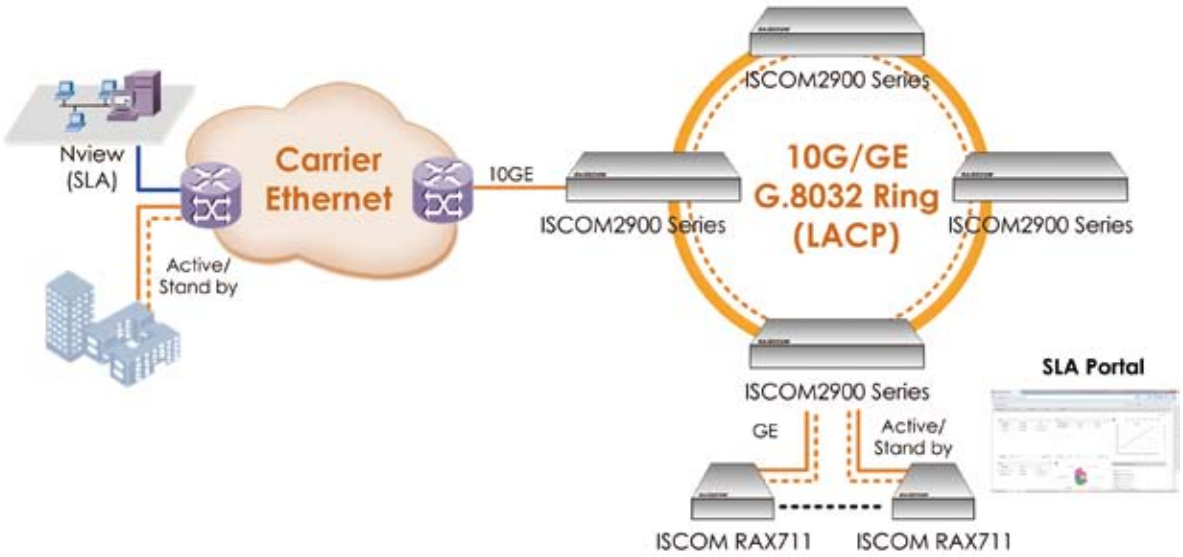
Raisecom provides a reliable bandwidth, ensuring data security, minimizing potential economic loss (due to network failures), delivering end-to-end Carrier-grade services with a reliable SLA. Since Raisecom is part of high grade networks, Raisecom solutions enable high-availability services with L2/L3 demarcation in a versatile access infrastructure. Access rates range from 2Mbps to sub-100Mpbs, up to 1Gbps and 10Gbps, meeting highly adaptable, versatile, and incremental bandwidth requests.

Currently, operators are offering a variety of services, while attempting to maximize their infrastructure. Therefore, Raisecom also provides flexible combinations of product portfolios to assist combining state-of-the-art data technologies with mobile implementation, management and solution-enabling maintenance.

High Performance SLA-Assuring Ethernet Business Service

Solution Description

CE's inherent capabilities enable the availability of services such as "wholesale demarcation," indicating the requirement for deploying end-to-end QoS and increasing service performance visibility between wholesale terminals and service providers. The three services of CE1.0 contain expansions to CE2.0 with eight models in E-Line, E-LAN, E-Tree and E-Access. All these enable Carriers to invent, deliver and utilize new services over a short period of time. In addition, CE2.0 carries updated standardized and powerful service features of Multi-CoS. These include performance objectives, communication and manageability through the integrated delivery of the MEF service attributes, implementation agreements and management specifications.



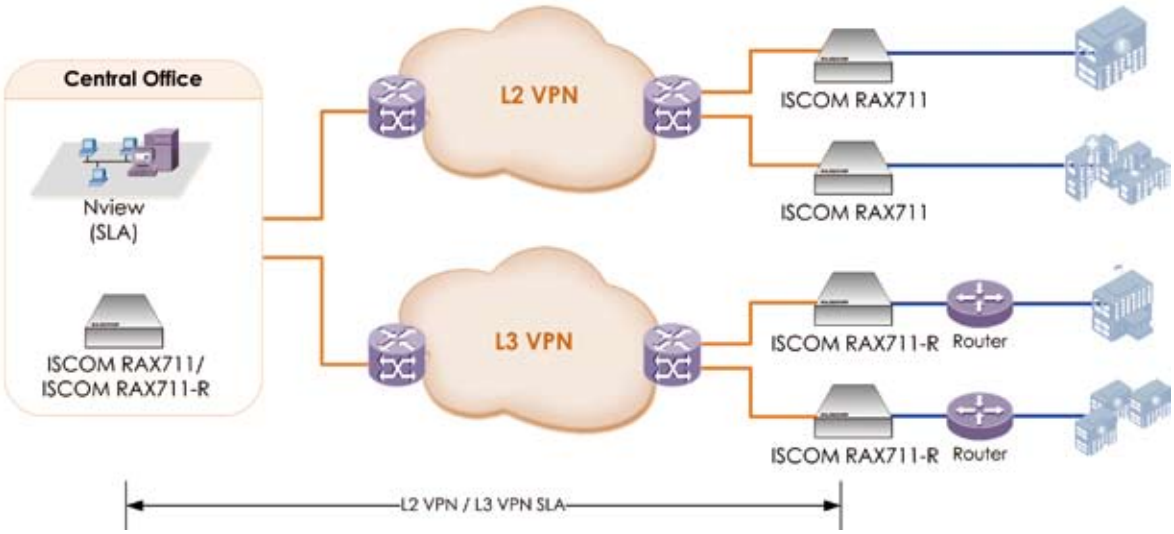
Solution Highlights

- Ensures a high availability service, which guarantees continuity with 50ms switch-over time
- Adaptable scalability up to 20G Ethernet ring with G.8032 and LACP functions
- Hardware-based performance monitoring ensuring end-to-end SLA services
- Variety of FE, GE and 10GE Ethernet services at end-user side
- ISCOM2900 Series includes 24/48 GE downlinks and up to 4 x GE/10G uplinks
- Support end-to-end L2/L3 Y.1564 traffic for service activation testing

SLA Across Hybrid L2/L3 VPN

Solution Description

Provides a cost-effective solution, delivering SLA monitored over both L2VPN and L3VPN (end-to-end). The solution includes a flexible service extension and integrated management, as well as consistent service guarantees, which are recognized by Carriers at minimized additional costs.



Solution Highlights

- Hardware-based performance monitoring sets, guarantee test result accuracy
- A complete set of test including Y.1731, Y.1564, RFC2544 is available for selection by the customer based on their requirements
- The Y.1564 standard test runs across hybrid L2/L3 VPN and generates reports on throughput, frame delay, frame delay deviation, frame loss and availability
- The GUI-based SLA portal presents the test results accurately and flawlessly

IP/MPLS VPN Pre-Aggregation

Solution Description

L2/L3 VPN is currently the main private line service. However, due to the high cost and complicated maintenance processes, it is difficult to provide an end-to-end IP MPLS service to additional customers. The Raisecom solution and products implement services, which communicate with the main vendors worldwide to enable future L2/L3 VPN cost-effective marketing.

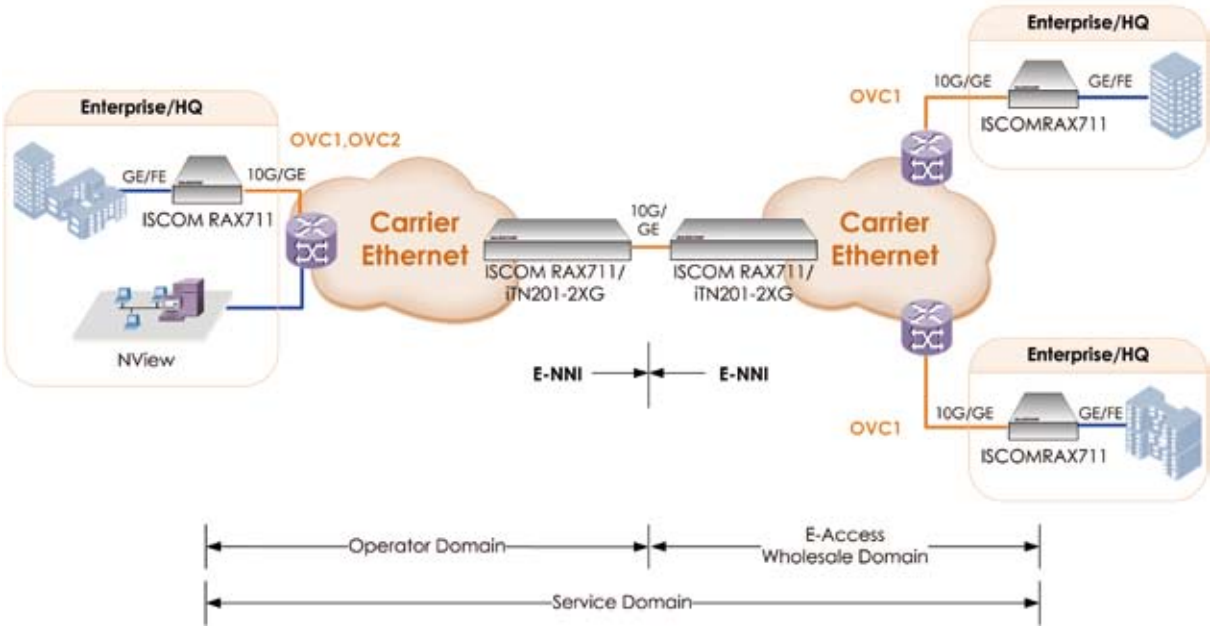
Solution Highlights

- Chassis-based PE POP device with inherent high switching ability reducing CapEx, while improving network flexibility and scalability
- CPE Options are available to fit in scenarios containing different interface type and capacity requirements
- End-to-end VPLS built over IP/MPLS-based network from the core down to the access CPE
- Robust, stable-operating hardware and software system
- Unified and user-friendly provisioning and service-based management, reducing OpEx

MEF CE-based Wholesale and Carrier of Carrier Ethernet Service

Solution Description

Provide the communication process between the different carrier and/or service provider networks using a MEF-certified external network-network interface (E-NNI). Enables a continuous uninterrupted communication process between the carrier networks.



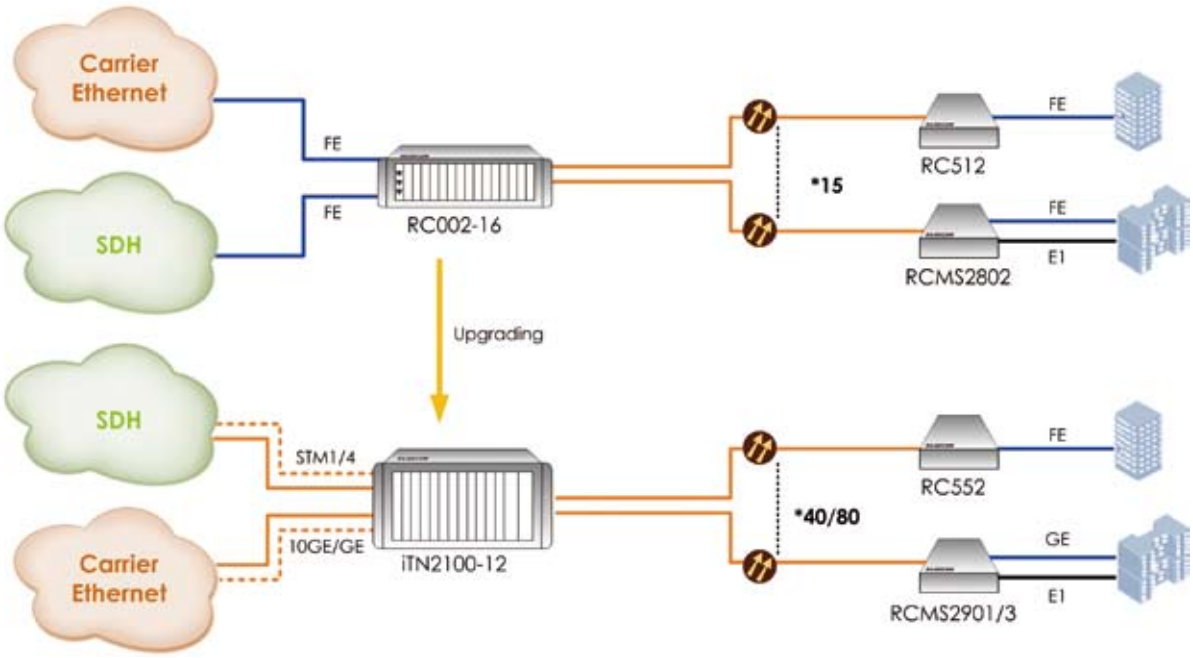
Solution Highlights

- Compliant with MEF-33 E-Access service attributes in terms of single/multiple-CoS Ethernet virtual connection (EVC) and/or Operator virtual connection OVC
- Scalable E-NNI interface capacity up to 10G with secured redundancy
- Simplifies buying and selling of wholesale services and enable new providers to join the CE community at an affordable cost easily
- Supports Multi-Carrier network communications with E-NNI

Multi-Service Aggregation over Legacy and Packet Networks

Solution Description

Offers a sustainable solution seamlessly delivering multi-types of leased line services, over a legacy and packet transport network. The solution includes dual-core platforms design, as well as broad choice of service cards, which enables service providers to achieve a structured investment as their business grows.



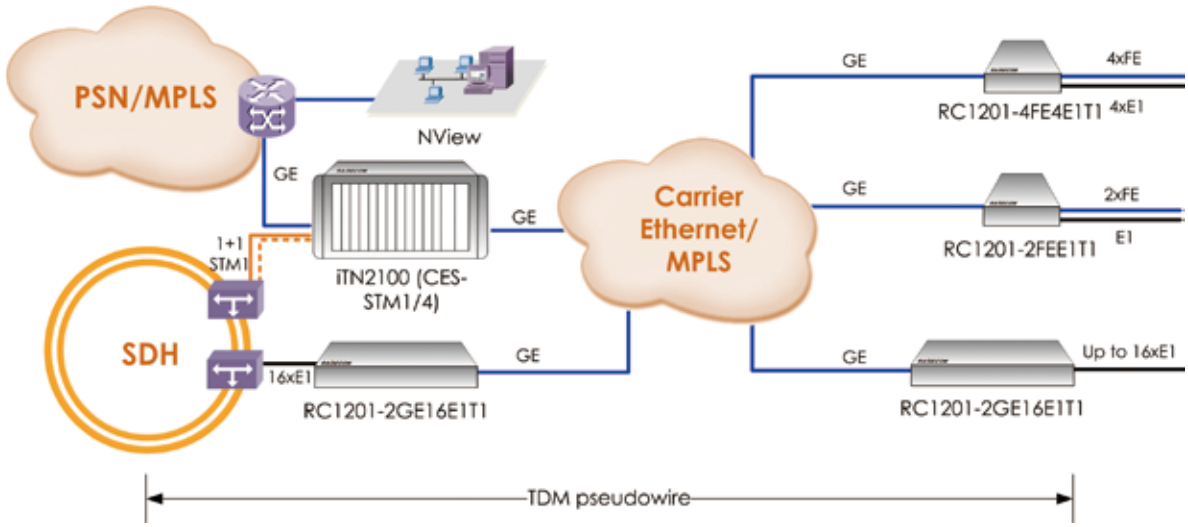
Solution Highlights

- Delivers legacy voice and data traffic together with MEF-compliant service types by aggregating a wide range of circuit simulation and Carrier Ethernet CPEs
- Sufficient switching capacity and bandwidth, high port density, easy-to-use GUI configuration, and environment-friendly power design
- Full suite of Ethernet OAM, enabling performance monitoring and trouble-shooting functions
- Comprehensive redundancy design for transporting mission-critical services
- Save on Carrier CapEX and OpEX for a smooth migration from TDM to cost-effective broadband Ethernet access
- Applicable to Multi-G mobile backhaul applications

TDM Extension over Packet Networks using Pseudowire

Solution Description

Legacy TDM services can be transported over Ethernet or MPLS-based networks using pseudowire technology. Business connections can be delivered point-to-point and point-to-multi-point topologies and transportation infrastructure. Demarcation points can be defined between the transportation network and the customer premises with a reliable SLA.



Solution Highlights

- Extended legacy services over cost-effective NG packet networks, and enables configurable delay jitter compensation, meaning delay variation introduced by the packet network backbone
- Supports standardized SAToP CESoPSN, TDMoIP, HDLCoPSN pseudowire encapsulations
- Advanced Ethernet QoS, traffic management and end-to-end OAM (802.3ah, 802.1ag, Y.1731)
- Flexibility applied to point-to-point and point-to-multipoint TDM over IP solutions; Ethernet ring topology with 50ms switching protection

Mobile Backhaul and Fronthaul

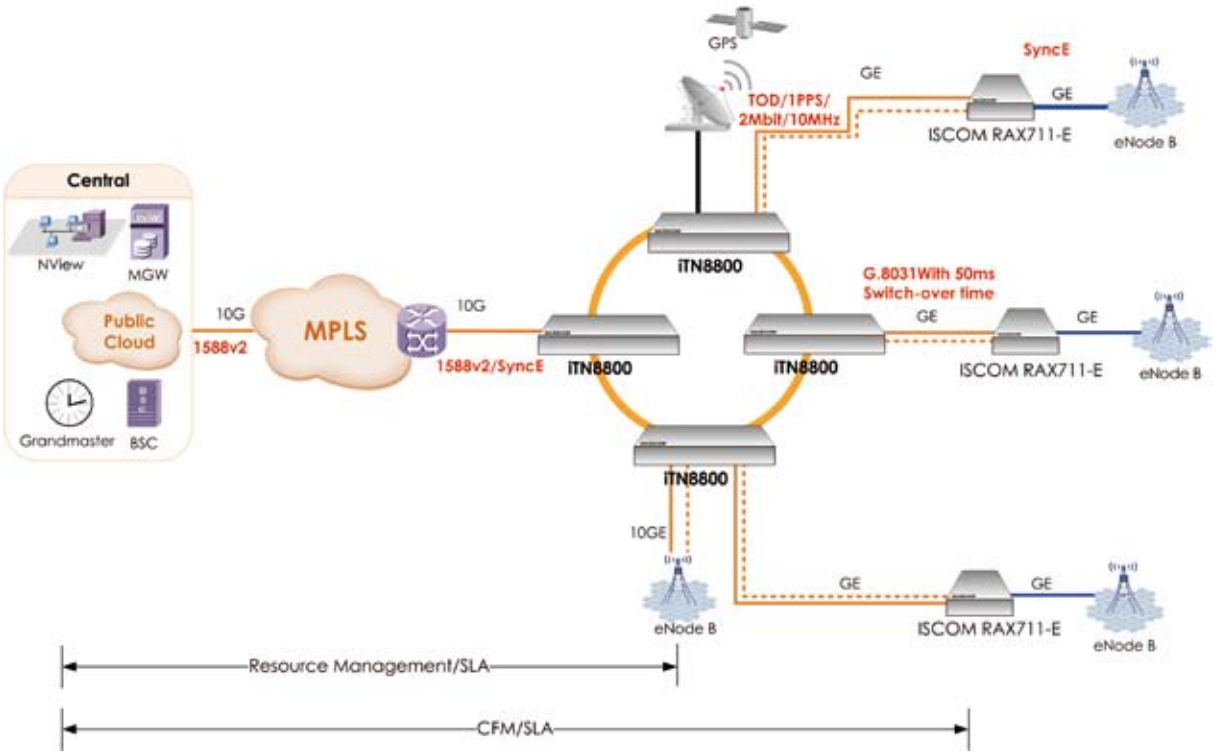
The constantly growing number of smart phones and mobile devices and their associated bandwidth drive mobile operators to improve their networks. This includes improved efficiency, increased bandwidth capacity, and expanded coverage of their networks. The choice of mobile backhaul technologies is becoming a crucial factor for operators aiming to deliver guaranteed mobile services and remain profitable in an era with a declining ARPU.

Raisecom's mobile backhaul solutions support voice-sensitive and data-intensive traffic at affordable costs. It enables reliable and smooth migrations of multi-G (2G, 3G and LTE) mobile services over legacy, and packet-based or Metro Ethernet networks. The solutions, which are engineered carefully, include some of the following capabilities: auto-provisioning, bandwidth optimization, and performance monitoring, which assist in reducing OpEX and increasing network availability.

LTE Mobile Backhaul over MPLS

Solution Description

The 4G LTE technology contains carriers deploying many more cells, which are required to accommodate the coverage and service over RAN. The Ethernet demarcation device ensures low jitter, low latency, stringent traffic engineering and real-time SLA.



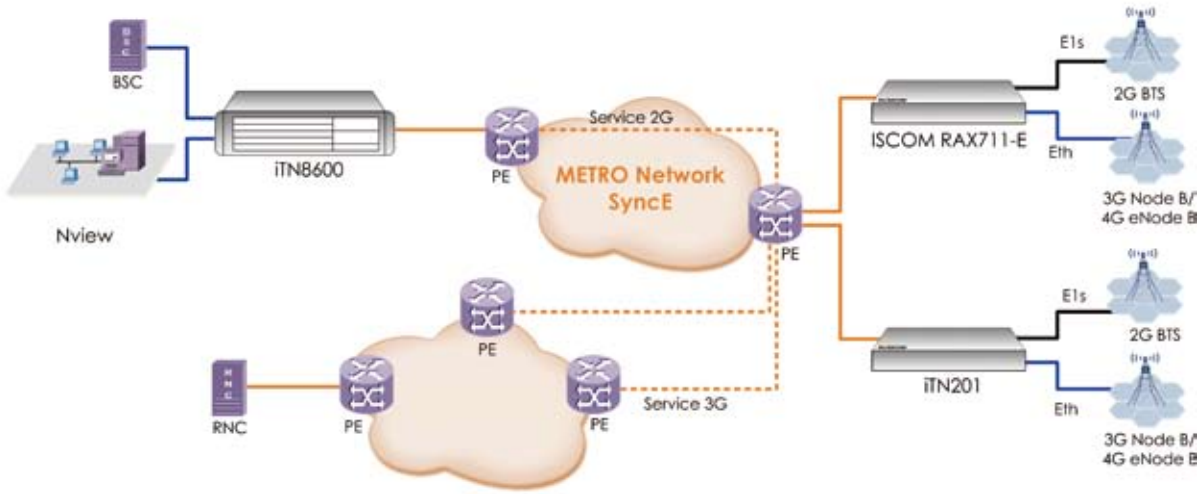
Solution Highlights

- Time synchronization using SyncE and transparent relay of 1588v2
- Real-time monitoring of SLA KPIs
- Standardized security using G.8032 and G.8031 with both switch-over and recovery time of less than 50ms
- Supports fault tolerance, meaning fault detection to prevent propagation of the failure
- Scalable up to 10G access capability
- Reliable and robust operational performance
- Full suite of traffic measurement tool for service activation, monitoring and troubleshooting

2G/3G/4G LTE Mobile Backhaul over PTN

Solution Description

The Backhauling of 2G BTS, 3G IP NodeB and LTE eNodeB over PTN networks poses specific challenges. The combination of performance monitoring, fault detection, remote trouble-shooting and SLA assurance (end-to-end) is crucial. In addition, such backhauling solutions must support SyncE in addition to 1588v2 OC/TC/BC modes and various input/output clock interface types, for accurate and reliable networking.



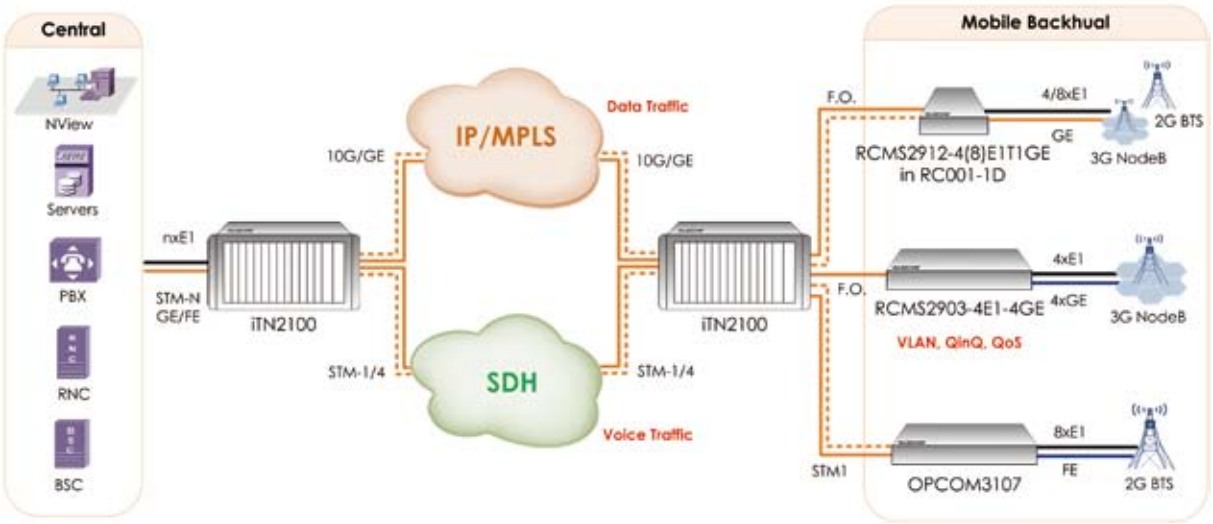
Solution Highlights

- MEF-compliant Ethernet services
- Phase and time synchronization support by 1588v2 PTP and Synchronous Ethernet
- Supports H-QoS with Ethernet SLA and service-based traffic engineering
- Enhanced Ethernet availability and resiliency with Ethernet linear and ring protection switching
- Supports MPLS-TP with circuit emulation of SAToP and CESoPSN
- Hot-swappable redundant power supply guaranteeing max up time
- High-density, 1-U compact aggregation model scalable up to 10G

2G/3G Mobile Backhaul with FiberMux

Solution Description

Allows mobile operators to leverage and manage co-existing multi-generation 2G/3G traffic. Bandwidth-intensive data flow can be delivered over cost-effective Ethernet/IP/MPLS networks, while voice streams are transported over SDH networks.



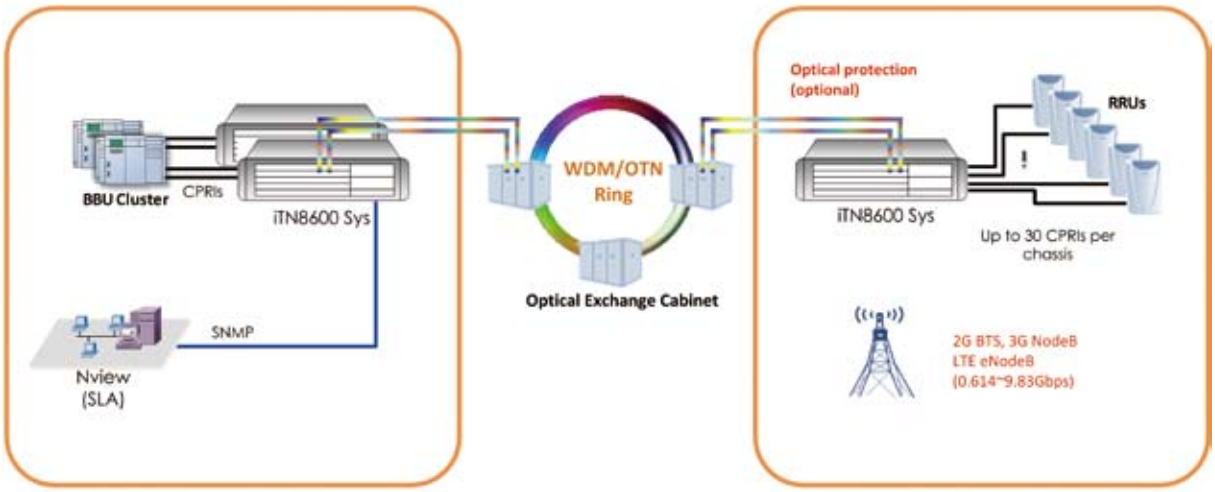
Solution Highlights

- Smooth progression from 2G to 3G networks
- Reduces CapEX by transporting bandwidth-demanding data service over packet switched networks
- Reliable Quality of Service (QoS) for voice and real-time traffic
- Supports one-plus-one fiber link protection for network resiliency
- Pre-configuration and integrated management
- Flexible point-to-point and point-to-multipoint network topologies

BBU Fronthaul

Solution Description

The BBU Fronthaul enables carriers to extend and increase radio coverage for mobile networks. This application saves some of the carriers' operational costs, such as rental expenses, power consumption, air conditioners, site survey, and so on. The advantage of this solution is basically to transmit up to 30 CPRIs to one remote site. It can transmit all CPRIs over WDM or OTN. In addition, the BBU cloud provides other benefits, enabling carrier to maintain and manage the entire wireless network.



Solution Highlights

- Collaborative rate from 0.614 to 9.83 Gbps
- Excessive OpEX and CapEX reduction
- Extended cost-effective wireless coverage
- Share auxiliary resources (GPS, power, batteries, and transmission)
- Flexibly allocating BBU resources via CPRIs extension, and load balancing implementation
- Line protection support

Small and Medium Business Access

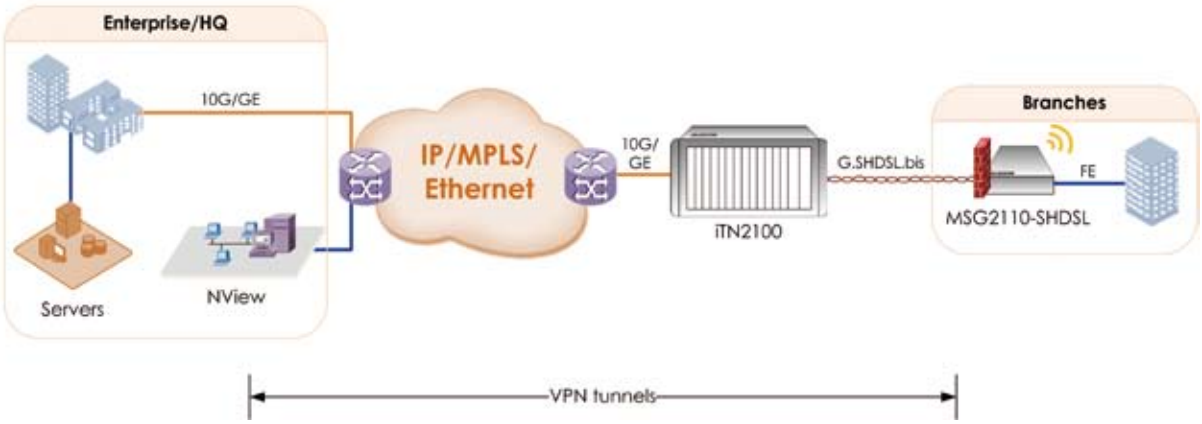
Small and medium size businesses generate a vast marketplace for telecommunication players, by migrating their business solutions to the Internet and cloud. The required information-base is a crucial factor for SME owners to stay in the market, and requires secured, strong and cost-effective networking.

Raisecom provides extremely cost-effective, VPN access solutions dedicated to SME users, to assist solving issues, including the lack of IT capabilities, limited budget, and the need for secured access. Raisecom solutions take into consideration features such as: Device integration, service integration and customer benefit maximization. This solution assists SMEs to fully utilize the private and public cloud network by combining routing, Ethernet switching, voice-support, 3G backup, Wi-Fi, VPN and secure-access features in their devices.

Copper-based VPN Connections for Distributed Financial System

Solution Description

Utilizes existing copper lines to deliver a VPN solution for a distributed financial system with business-level connectivity and expanded bandwidth.



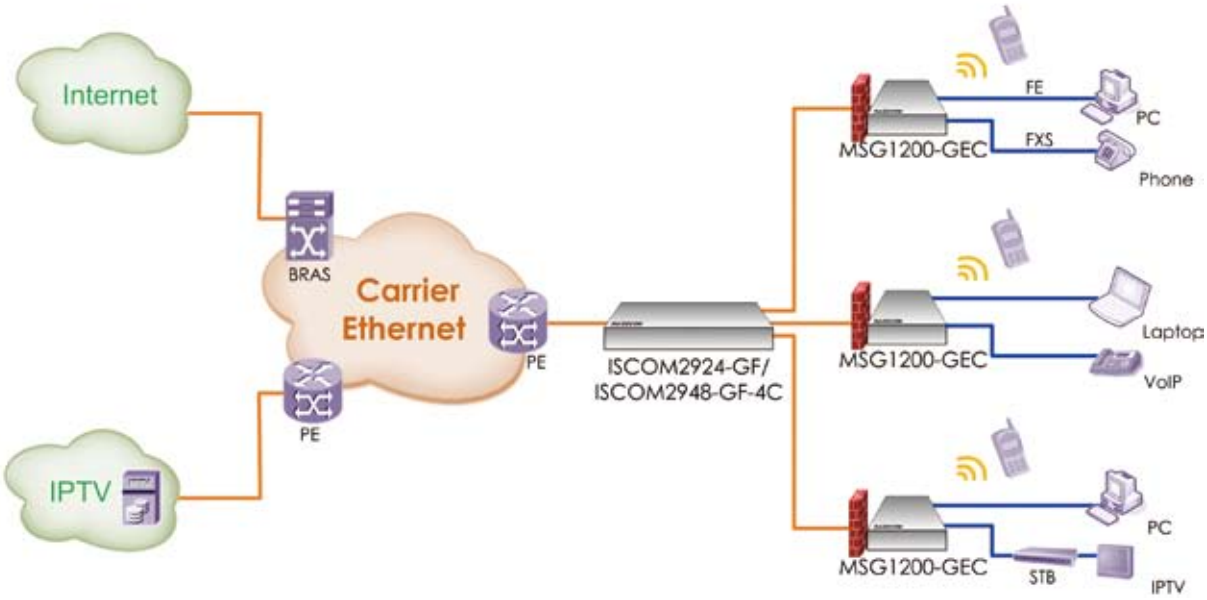
Solution Highlights

- Extend SLA-based services over an existing copper infrastructure
- Latest G.SHDSL.bis technology enables higher bandwidth to be delivered with minimized costs
- Safety features including IPSec, VPNSec and Firewall keep SME networks fully protected
- MSG solutions with L3 routing functions (RIPv2 and OSPF) saves additional router expenditure and maintenance efforts for SMEs
- Allows for pay-as-you-grow smooth progression from copper to fiber networks based on the integrated aggregation platform

B2B Access with SME Routers

Solution Description

The solution for Enterprise users to inter-operate (work together) an SME router with various Ethernet Switches from major vendors to meet the worldwide residential market requirements. The SME router SOHO/Home Gateway is simple to use and manage for Home and SOHO users. It integrates routers, switches, firewalls, VPN, WLAN and USB interface for 3G in one single device.



Solution Highlights

- Combo GE interfaces uplink
- USB interface for 3G/4G dongle uplink
- Supports 802.11 b/g/n
- Supports IEEE802.1q, 802.1p and TOS/Diff-serv
- Supports L2TP/IPSEC VPN
- Firewall, Content filtering, Anti-DoS, Anti-ARP
- RIP v1/v2, OSPF, IPv4/IPv6
- Supports Routing, NAT/NAPT, DHCP, DNS/DDNS, IEEE802.11 b/g/n, PPPoE
- Standard stand-alone and wall-mounted design
- Managed via Web management, TR069, SNMP, Telnet, CLI

Industrial, Utilities and Transportation

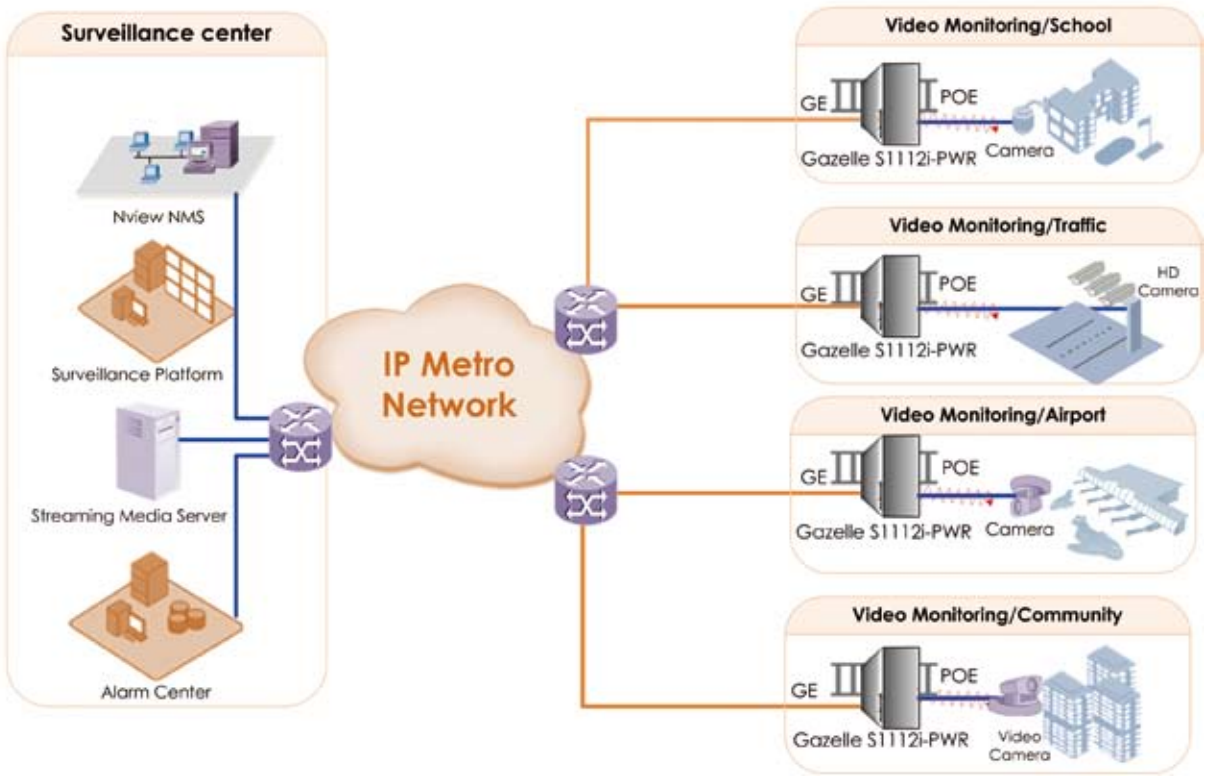
Industrial and utility applications drive unique challenges to network planners. Firstly, it involves mission-critical traffic, which may be closely related to people's every-day life and public safety, and requiring high network reliability and resiliency. Typically, it is required to provide support from low-speed data communication, digital and analog voice, TDM circuits and analog control, to mobile coverage, multimedia traffic, integrated surveillance and broadband access. In addition, it must survive a wide range of environmental conditions and comply with the stringent industrial conditions.

Raisecom provides PCM connectivity solutions for SCADA traffic as well as Ethernet-based industrial products. This combination serves the broadband demands in the fields of energy (power, gas, oil, mining, water), transportation, public information and military.

Safe City Video Monitoring

Solution Description

The POE industrial switch feeds power to the IP camera for monitoring purposes, to ensure the city's security is secured.



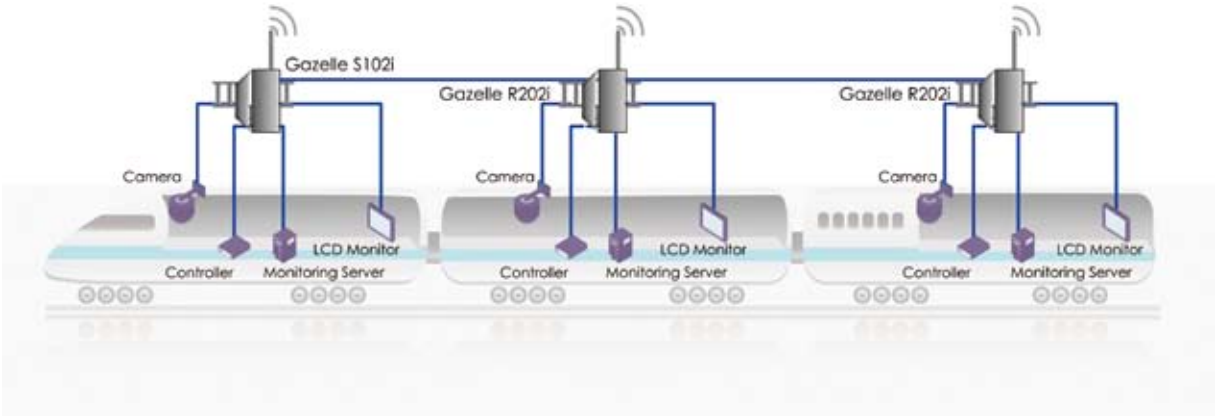
Solution Highlights

- Power over Ethernet complied with IEEE802.3af/at
- Supports AC and DC power supply on industrial switches
- DIN RAIL mounting
- Full suite of Layer 2 Ethernet features and functions
- Up to 8 Ethernet ports for power feeding
- SNMP management

Mobility System for Vehicle and Trains

Solution Description

The 3G/4G LTE access router enable high speed vehicles to overcome mobility and vibration issues for communication.



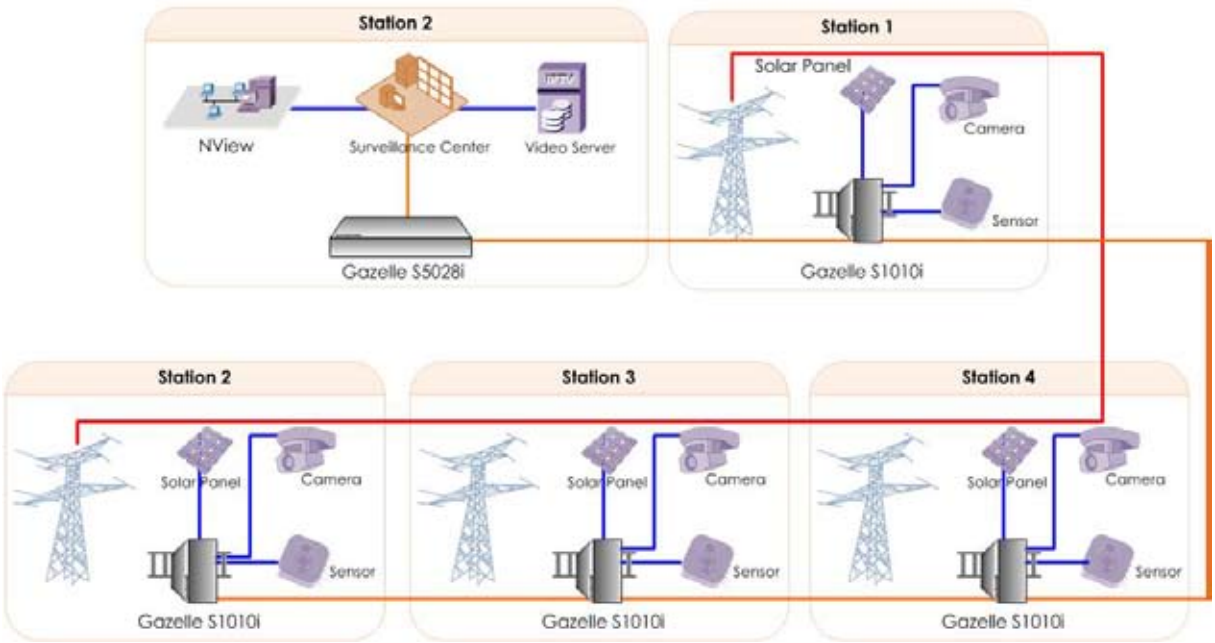
Solution Highlights

- M12 interfaces comply with EN50155 with a mounting panel
- Supports AC and DC power supply on industrial switch
- DIN RAIL mounting
- Full suite of Layer 2 Ethernet features
- Built-in dual 3G/4G LTE module to access Radio Access Network for mobility communication with routing functions
- SNMP management

Smart Grid Communication for Power or Utility Companies

Solution Description

Indicates a SCADA transmission service, along with a power grid station and video surveillance.



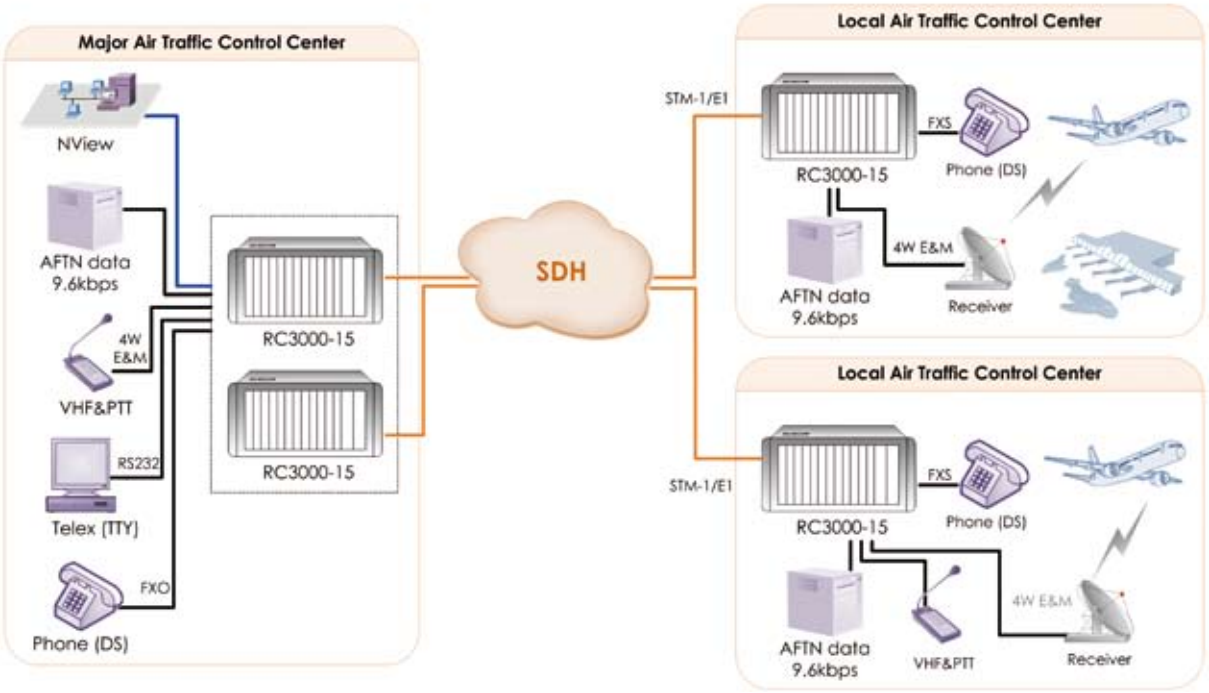
Solution Highlights

- IEEE1613, IEC61850
- Supports AC and DC power supply on industrial switches
- DIN RAIL mounting
- Full suite of Layer 2 Ethernet features
- Daisy chain topology along with power grid transmission lines
- SNMP management

Air Traffic Control

Solution Description

Provides a reliable, uninterrupted and multi-service connectivity between control center/towers and aircrafts, complying with various requirements for airline supervision, airport management and traffic control operations.



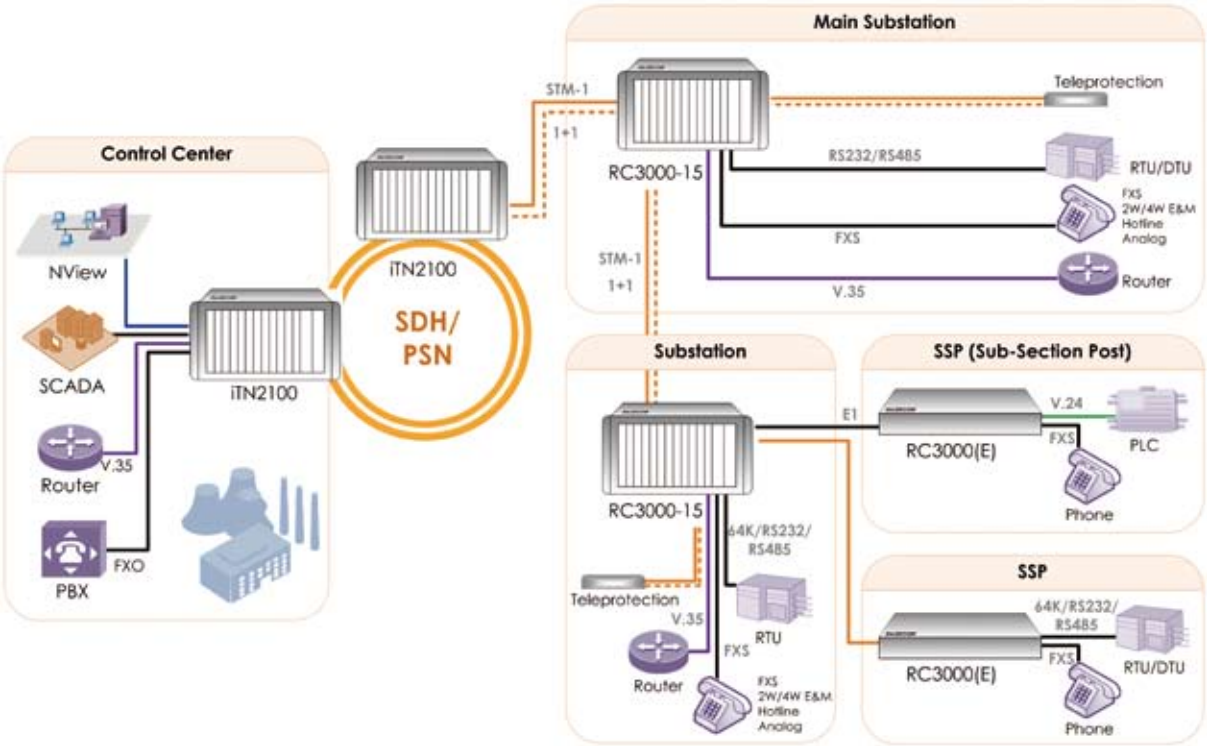
Solution Highlights

- Uninterrupted air-ground communications
- Delivery of direct speech (DS), Telex (TTY), VFT, PTT and AFTN data
- Various types of standardized interfaces for delivery of other voice, fax, LAN and data services
- Optimized bandwidth utilization over leased line transmission
- Accommodates rigorous field operations with a rugged design
- Central configuration, management and monitoring

SCADA Aggregation for Power or Energy

Solution Description

The solution provides a reliable transmission of critical control signals and data traffic between central offices and remote sites. A variety of voice, data and video surveillance applications can be seamlessly transported across links with limited bandwidth or long distance.



Solution Highlights

- Delivery of SCADA, C37.94 teleprotection solution, voice, LAN, data and video streams using reliable and robust multi-service solutions
- TDM protection over E1/STM fiber interfaces combined in PSU/DXC cards
- Supports various types of narrowband and broadband interfaces
- Hot-swappable sub-cards and redundant power supply
- Flexible form-factor choices enable selecting the best solutions based on budget, rack space and power consumption
- Future-proof for migration to IP with a dual-core aggregation system
- Supports a centralized management system as well as a flawless integration process with OSS

- Intelligent access products

- Broadband access products

- Carrier Ethernet Switches

- Industrial Grade Products

Broadband Access

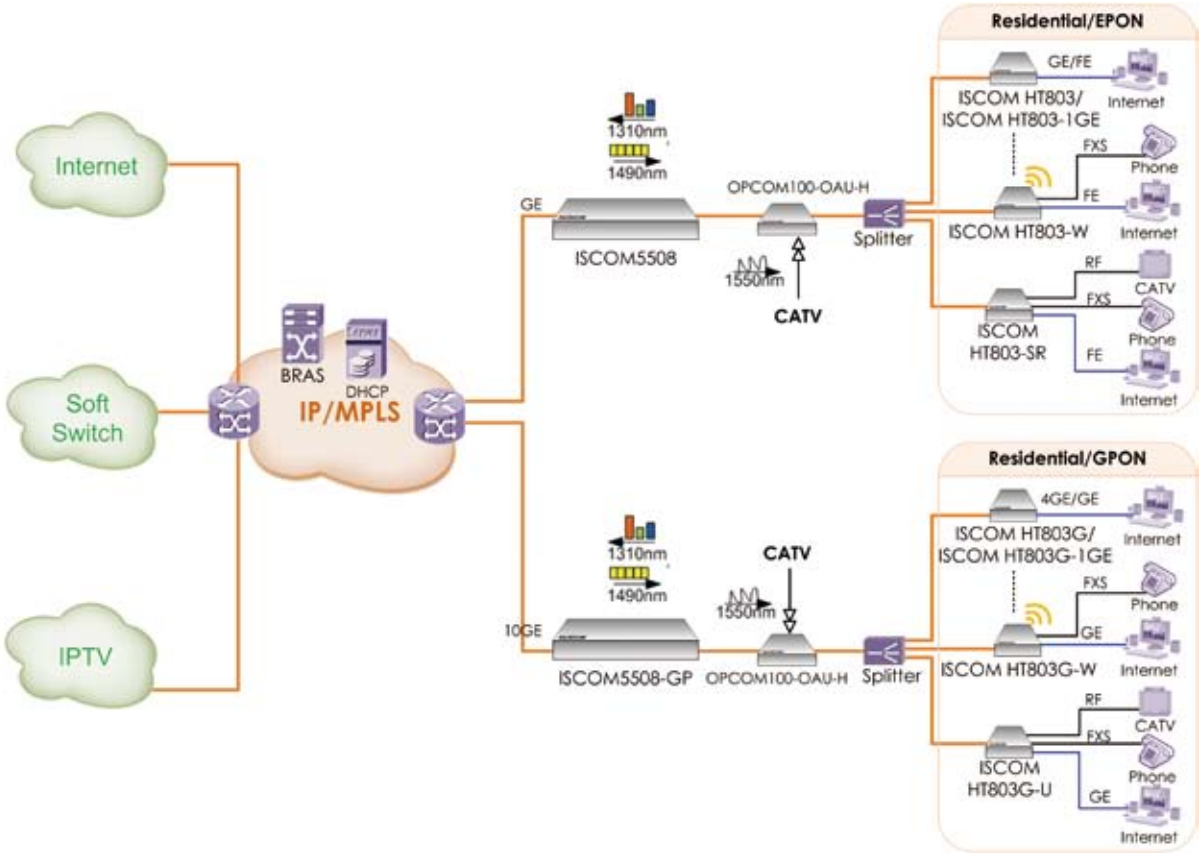
More and more families are benefiting from Fiber To The Home (FFTH) technology, benefitting from modern life, based on Triple-Play data, voice and CATV services at reasonable cost. In addition, the introduction of mobile service and hence quad-play offerings adds bandwidth and QoS demands.

Raisecom offers both active Carrier Ethernet and Passive Optical Network (PON) access and aggregation solutions for high-density urban residential applications. Comprehensive streams of voice, data, video and sometimes cellular can also be delivered to rural and less populated areas with low cost fiber, copper and wireless routers. In addition, it is future-proof for sub-GE and sub-10G bandwidth requirements.

FTTH Triple Play for Suburb and Rural Areas

Solution Description

This solution facilitates low cost per bit Fiber To The Home (FTTH) for triple-play services with integrated management. It enables point-to-multipoint connections from the point of presence (POP) to the customer's premises for NG broadband services.



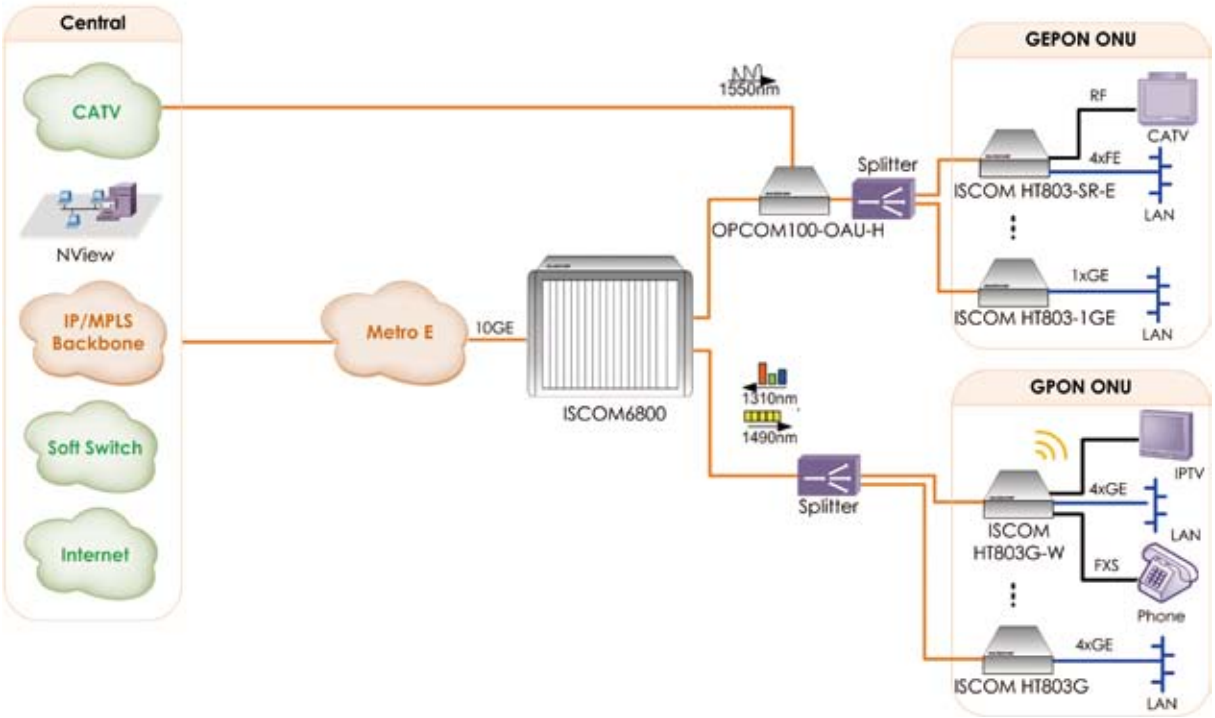
Solution Highlights

- Compact form factor providing an economical solution for sparse-populated communities
- Supports delivery of data, voice, CATV and Wi-Fi services
- Supports various management and monitoring features, including, 802.3ah EFM, 802.1ag CFM and Y.1731
- Enhanced network security using 802.1x, RADIUS and TACACS+ authentication
- Modular design ensures flexibility for future expansions with a low TCO
- Future-proof for remote management of both GEPON and GPON ONUs

xPON Solution for City Carriers

Solution Description

Establishes a reliable, cost-effective and easy-to-manage fiber network for city carriers for the delivery of residential, business, public and wireless services. The solution is adaptable to both EPON and GPON technology and provides sufficient switching capabilities.



Solution Highlights

- Aggregates and transports data, voice and video traffic from other OLTs or Switches over Ethernet backbones
- Network reliability and resiliency assuring ring protection, link redundancy and hot-swappable power supply
- Enhanced network manageability, which is supported by OAM, CFM functions
- Supports IEEE 802.3ah (EPON), ITU-T G.984 (GPON) and IEEE 802.3av (10G EPON)
- Available in various port densities and in-door/ out-door remote models
- Central management assures reduced OpEX

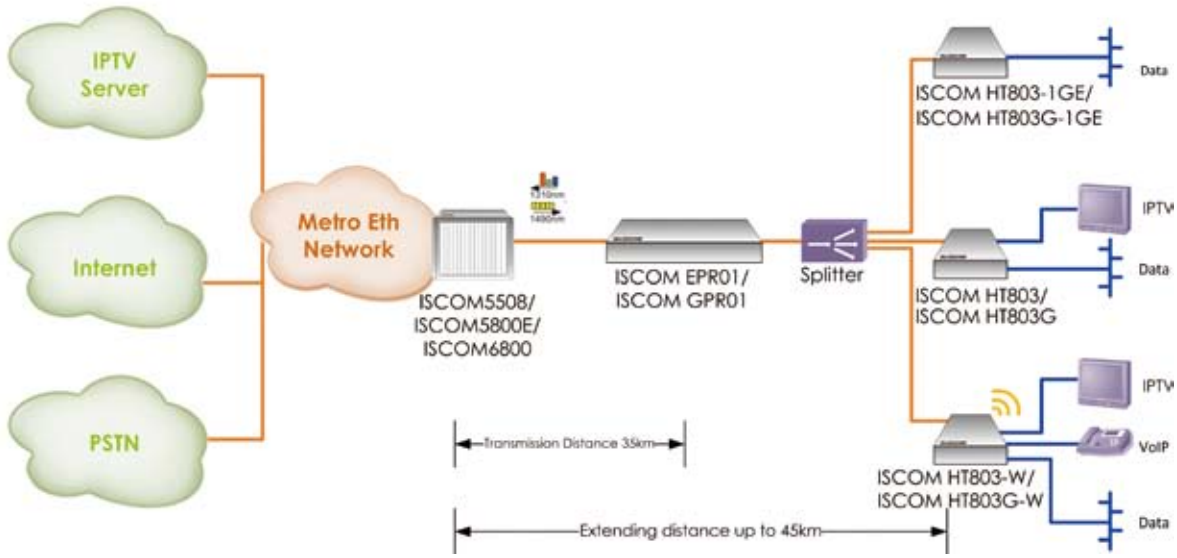
FTTH Transmission Distance Extension

Solution Description

In a FTTH network solution, the deployment of the transmission distance is restricted due to the EPON technology. With the central deployment of a large capacity OLT (in large scale), the main challenge is the transmission distance from OLT to the splitter which may overcome the technology restriction.

The carriers are demanding a solution for the best use of space, saving electricity resources, deployment costs and acquiring the full use advantage of easy deployment at the PON side.

In Raisecom using the FTTH solution, we use the transmission distance extension device to effectively extend the carrier transmission distance up to 45km and facilitating deployment and management.



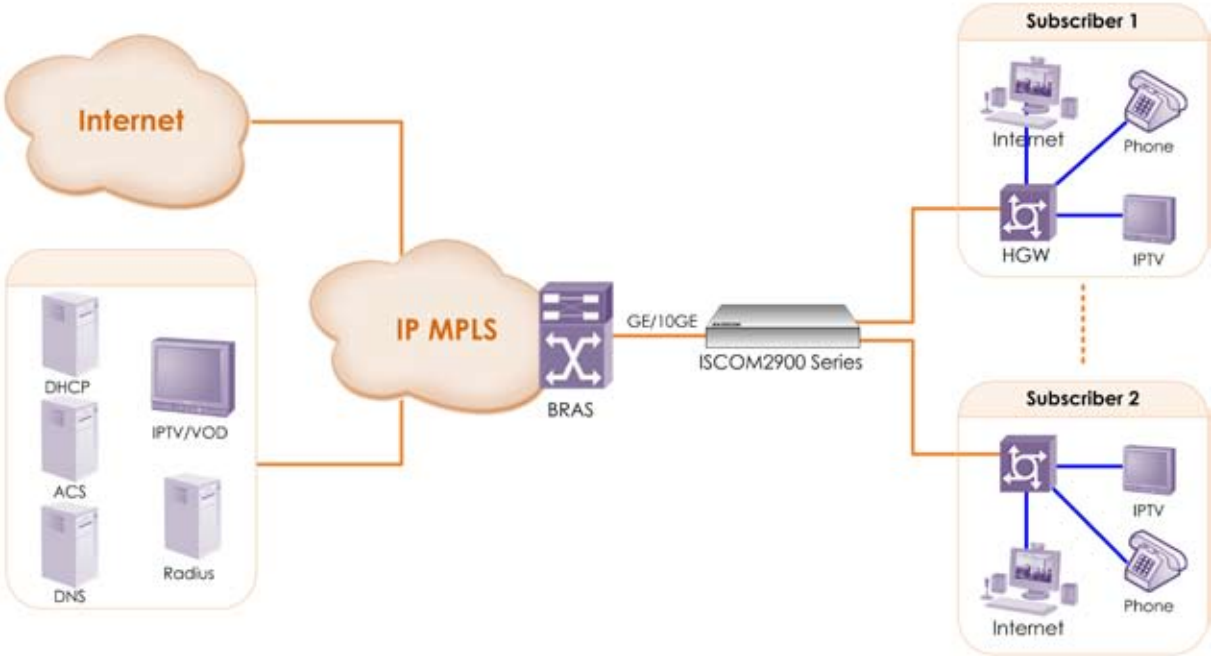
Solution Highlights

- Cooperation with Raisecom EPON/GPON system,which extends transmission distance up to 45km/40km
- Increased optical power budget to enlarge splitter rate
- The Optical Electrical Optical function recognizes the 3R signal (Regeneration, Reshaping and Retiming) function

Active Ethernet for Internet and IPTV Services

Solution Description

In FTTH networking customers come from regular families requiring high bandwidth, IPTV services and, long and stable network connections. Meanwhile, the carriers consider providing cost effective services, CaPEX and OpEX wise, that meet families' demands.



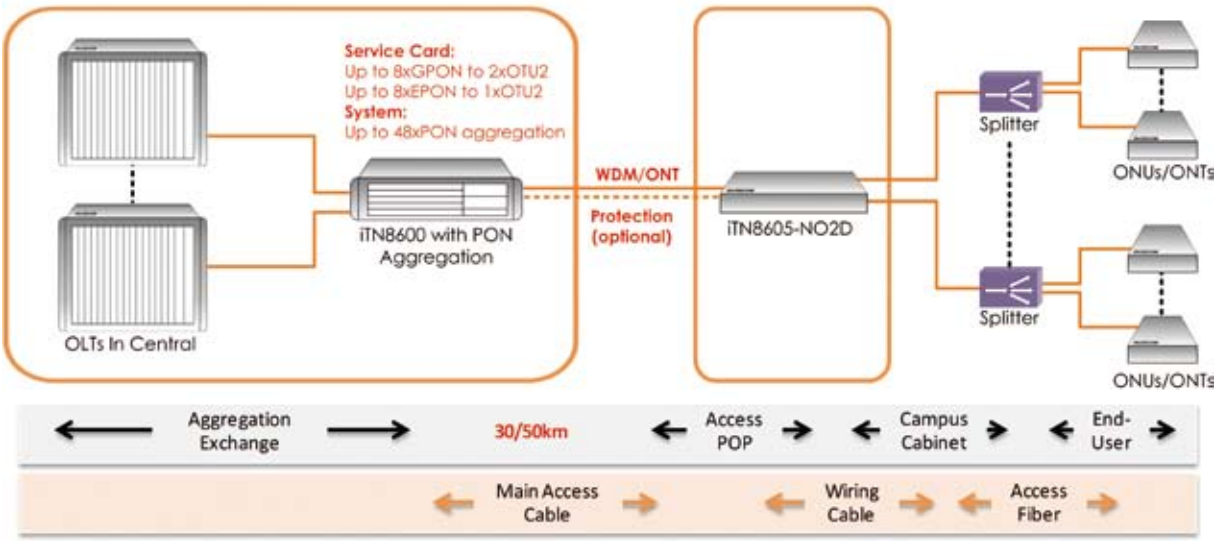
Solution Highlights

- Support various multicast functions (one-to-many or many-to-one) including MVR, IGMP Snooping, MVR Proxy and IGMP Profile
- Zero interference between multicast flow subscribers
- Port-based and VLAN-based multicast flows and PPPoE sessions
- Supports various login methods via Radius, Tacacs, SSH to ensure network device security

PON Service Aggregation & Extension

Solution Description

The xPON vast deployment solution, consumed countless fiber resources in the past, irrelevant to the central OLT cloud distributed pizza box OLT. The proposed solution's aim is to save access fiber and generate new services, which include mobile backhaul, leased line service or access ring by saving fiber. Meanwhile, the central OLT cloud can generate additional benefits on saving management and operation costs, avoiding additional expenses on the distributed OLT construction site (which utilizes power supply, air-conditioning, and so on). This solution also resolves distance limitation caused by practical fiber reduction. It enables the carrier to deliver a xPON service up to 50km.



Solution Highlights

- High aggregation rate enabling considerable access of FTTH subscribers with minimized fiber resources
- The GPON/EPON service coverage is extended up to populated cities with a 50km//30km landscape radius
- Supports xPON over dark fiber, DWDM and OTN
- Provides protection mechanism
- Supports individual PON clock signaling
- Supports up to 8 x GPON OLT ports aggregation to 2 x OTU2, or 8 x EPON OLT ports aggregation to 1 x OTU2 per service card
- Supports maximum 48 x GPON or EPON OLT ports aggregation per chassis
- Supports G.709 OTU2 encapsulation and OTU2 OAM
- Supports line protection

PRODUCT CATALOG

Chapter 1. Carrier Ethernet

Carrier Ethernet (CE) now extends to the access and beyond, and is available over an increasing variety of technologies. All the increased bandwidth requirements, ease of convergence for multi-services and migration to 4G cellular networks ensure that this trend continues. The Carrier-class Ethernet services are provided within cities and national borders. However, in addition, they can span multiple providers globally. The CE's inherent capabilities enable the availability of services such as "wholesale demarcation. These services indicate the requirement for deploying end-to-end QoS and the increasing service performance visibility between wholesale terminals and the service providers. The three services of CE1.0 have increased to eight services in CE2.0 to including E-Line, E-LAN, E-Tree, and E-Access, thus enabling providers to create new services. Furthermore, CE2.0 carries newly standardized and powerful service features of a Multi-CoS solution with performance objectives, interconnectivity and manageability through the integrated delivery of MEF service attributes, implementation agreements and management specifications.

Ethernet Demarcation Device

ISCOM RAX711(-E)/iTN201-2XG

The ISCOM RAX711(-E)/iTN201-2XG is a Next Generation Carrier-grade GE/10GE demarcation device.
This device can be utilized for E-Line and E-LAN services for Mobile Backhaul (MBH), as well as Large Enterprises, and Small/Medium Business services. It complies with ITU-T Y.1564 SAT for the service turn-up and guarantees end-to-end SLA performance monitoring and service visibility based on hardware that is fully compliant with OAM, CFM and Y.1731/SLA. The Service-based QoS helps to differentiate flows and to commit forwarding priority within each EVC and supports ITU-T G.8032/1, providing a ring/linear protection within a sub-50ms for MBH and business connections.
Due to the challenges faced in deploying, provisioning, managing and trouble-shooting Ethernet segragation devices, Raisecom introduces the CEView auto-provisioning GUI tool, which provides an integrated, effective and economic solution for Carriers to gain additional benefits from Metro Ethernet without any issues.

ISCOM RAX711

ISCOM RAX711-E

iTN201-2XG

FEATURE

- Supports ITU-T G.8031/8032 ELPS/ERPS with sub-50ms switch-over time
- ITU-T Y.1564 SAT
- Hardware-based IEEE802.3ah OAM, 802.1ag CFM, Y.1731/SLA
- 1588v2 Transparent
- Automatic service provisioning configuration and modification
- NView, CEView, Web-portal based SLA report
- CE2.0 Certified E-Line, E-LAN, E-TREE and E-Access services

P/N	ISCOM RAX711	ISCOM RAX711-E	iTN201-2XG
NNI Interface	2 x 100/1000M Base-X SFP interface	2 x GE SFP	2x10GE 10GBase-X XFP
UNI Interface	4 x combo ports (4 x 100/1000M Base-X SFP; 4 x 10/100/1000M Base-T RJ45 ports)	4 x GE combo, 1 x 2Mbit/2MHz clock interface (RJ45), 4 x E1 interfaces (RJ45/DB37)	Main Card: 6xGE Base-X/Base-T SFP or Base-BX TSFP, TSFP expand to 12xGE access Sub Card(2 slots): 2x10GE 10GBase-X XFP Sub-card (slot2) 4xGE 100/1000 Base-X SFP Sub-card (slot1/2) 4xGE100/1000 Base-T RJ45 Sub-card (slot1/2) 8xE1/T1 balanced RJ45 Sub-card (slot1/2) 8xE1 unbalanced DB37 Sub-card (slot1/2) TSU ClockSub-Card 2Mbits/2MHz/1PPS+TOD/1PPS (slot1/2)
Dimension	220 (W) × 180 (D) × 43.6(H) mm3		440(W) x 266(D) X 44(H) mm3
Clock	1588v2 Transparent	1588v2/SyncE	
Power	Hot-swappable redundant power supplies (dual-feed)		Hot-swappable redundant power supplies (dual-feed) Support -48V/24V/100~240V
MTU	12,288 Bytes	13312 byte	

L2 Manageable 10G Aggregation Switch

ISCOM2900 Series

The latest CE aggregation switches, the ISCOM2900 series, feature high capacity, assured SLA, full protection, consistent performance and integrated management. These switches complement the Raisecom Carrier Ethernet product lines, and have become one of the requirements for optical metro network solutions. These devices possess a complete suite of manageable L2 aggregation features with powerful hardware designs supporting up to 4 x 10G Ethernet uplinks and offering optional redundant hot-swappable AC or DC power supplies. The ISCOM2900 is often used for intelligent aggregation purposes in network architectures for a Metropolitan Area Network data convergence, business connections, mobile backhaul and cloud access. Additionally, with up to 48 SFP or RJ45 interfaces, it enriches service lines and provides an access rate of 100/1000Mbit/s. This ensures exceptional transmission quality and efficiency. In addition, this series plays an important role in accelerating large-scale deployment and provides diversified access solutions due to its high bandwidth provision (10G) and H-CAR performance. The entire series can fully fulfill an MEF defined CE2.0 E-Line, E-LAN, E-Tree and E-Access services. It complies with E-LMI, IEEE802.1ag/802.3ah, ITU-T Y.1731/G.8031/G.8032 and LLDP. The L2 MPLS VPN is also available via software upgrade.

ISCOM2924GF-4C

ISCOM2924G-4C

ISCOM2948GF-4C

ISCOM2948G-4C

FEATURE

- Dual software images
- Supports ITU-T G.8031/8032 ELPS/ERPS with sub-50ms switchover time
- Supports VLAN QinQ ACL per port/VLAN/EVC/CoS
- Supports hardware-based IEEE802.3ah, 802.1ag, ITU-T Y.1731 and L2/L3 SLA
- Supports IGMP MVR, DHCP, IPv6 and TACACS+
- L2 MPLS VPN via upgrade software supporting OSPFv2, RSVP and MPLS LDP
- Hot-swappable redundant power supply and fan modules
- Automatic service provisioning configuration and correction
- NView, CEView, Web-portal based SLA report
- CE2.0 Certified E-Line, E-LAN, E-TREE and E-Access services

P/N	ISCOM2924GF-4C	ISCOM2924G-4C	ISCOM2948GF-4C	ISCOM2948G-4C
NNI Interface	4 x 10GE SFP+ interfaces	4 x 10GE SFP+ interfaces	4 x 10GE SFP+ interfaces	4 x 10GE SFP+ interfaces
UNI Interface	24 x 100/1000M Base-X SFP interfaces	24 x 10/100/1000M Base-T RJ45 ports	48 x 100/1000M Base-X SFP interfaces	48 x 10/100/1000M Base-T RJ45 ports
Dimension	440(L) x 360(W) x 44(H) mm3			
Power	Hot-swappable redundant power supplies			
MTU	12,288 Bytes			

L2 Manageable Optical Switch

ISCOM2828F(D), ISCOM2924GF-4GE

The ISCOM2828F and ISCOM2924GF-4GE are designed for the full optical Carrier Ethernet access portfolio to provide cost-effective solutions for campus, enterprise, and residential access scenarios. The products have 24 x 100M Base-X or 100/1000M Base-X fiber client interfaces and 4 x SFP combo GE network interfaces that enable flexible network deployments such as a dual ring or ring and chain. In addition, the products offer a wide range of functionality that guarantees the MEF-compliant E-Line, E-tree and E-LAN services together with a full suite of management and protection mechanisms for FTTX triple-play applications. The ISCOM2924GF-4GE complies with E-LMI ITU-T Y.1731/G.8031/G.8032 and LLDP. The L2 MPLS VPN is also available via software upgrade.

ISCOM2828F(D)

ISCOM2924GF-4GE

FEATURE

- Supporst STP/RSTP/MSTP, redundant links and IEEE 802.3ad Link Aggregation, Ethernet Ring (ISCOM2828F ONLY)
- Supports ITU-T G.8031/8032 ELPS/ERPS with sub-50ms switch-over time (ISCOM2924GF-4GE ONLY)
- Supports VLAN, QinQ, ACL per port/VLAN/EVC/CoS
- Supports IEEE 802.3ah Link OAM, IEEE 802.1ag end-to-end connectivity OAM and ITU-T Y.1731/SLA
- Supports IGMP, MVR, DHCP, IPv6 and TACACS+
- Power supply redundancy for ISCOM2828F via RPS module, and hot-swappable redundant power supplies for ISCOM2924GF-4GE
- CE1.0 certified E-Line and E-LAN services for ISCOM2828F, and CE2.0 certified E-Line, E-LAN, E-TREE and E-Access Service for ISCOM2924GF-4GE

P/N	ISCOM2828F (D)	ISCOM2924GF-4GE
NNI Interface	4 x combo GE interfaces	
UNI Interface	24 x 100M Base-X SFP interfaces	24 x 1000M Base-X SFP interfaces
Power	AC or DC power supply with RPS redundancy	Hot-swappable dual power supplies
MTU	9,712 Bytes	12,288 Bytes

L2 Manageable Full Gigabit Access Switch

ISCOM2110G(-PWR), ISCOM2128G(E-MA-PWR)

The Raisecom ISCOM2100G is a typical L2 access switch used to carry and aggregate various services in the access layer. It offers effective solutions for triple-play FTTX and EPL/EVPL situations due to its compliance with standards such as IEEE802.3ah, 802.1ag, ITU-T Y.1731/SLA and ITU-T G.8032 (only for ISCOM2128G). It can coordinate with the ISCOM2924 series to form a ring network that efficiently aggregates services. In addition, it supports versatile and robust interoperations with the ISCOM2100EA-MA series to achieve a flexible network infrastructure due to the uniform L2 function module. In addition, the manageable ISCOM2100-PWR series Carrier Ethernet PoE switches can provide 8-24 PSE+ Fast Ethernet downlink access interfaces (up to 30 Watts per port) with 2/4 x Gigabit combo uplinks. The ISCCOM2100-PWR PoE switches can offer a power supply for power demand (PD) devices such as wireless Access Point (AP).

ISCOM2110G(-PWR)

ISCOM2128G

ISCOM2128GE-MA-PWR

FEATURE

- Supports VLAN, QinQ, ACL per port/VLAN/CoS
- Supports IEEE802.3ah, 802.1ag, ITU-T, Y.1731/SLA
- Supports IGMP, MVR, Multicast-filtering, DHCP, IPv6 and TACACS+
- Power supply redundancy via RPS module (ISCOM2128G series ONLY)
- STP and Ethernet Ring (50ms switch-over) for ISCOM2828F, and ERPS/ELPS for ISCOM2128G series
- Advanced QoS with CIR/EIR guarantee for ISCOM2128G series
- CLI, Telnet and SNMP (NView compatible)
- CE1.0-certified E-Line and E-LAN services, and CE2.0-compliant E-Line, E-LAN, E-TREE and E-Access services

P/N	ISCOM2110G	ISCOM2110G-PWR	ISCOM2128G	ISCOM2128GE-MA-PWR
WAN Interface	2 x 100/1000M Base-X SFP interfaces		4 x combo GE interfaces	
LAN Interface	8 x 10/100/1000M Base-T RJ45 ports		24 x 10/100/1000M Base-T RJ45 ports	
PoE	N/A	802.1af/at	N/A	802.1af/at
Ring protection	STP; Raisecom Ethernet Ring		G.8032 ERPS	
Power	Single AC/DC		Power supply redundancy via RPS module	

L2 Manageable FE Access Switch

ISCOM2110EA-MA(-PWR), ISCOM2128EA-MA(-PWR)

The ISCOM2100EA-MA L2 access switch provides solutions for both triple-play FTTX and EPL/EVPL. The uniform function module ensures flexible and robust interoperations (working together as a combined system) between the two complementary families to achieve accessible and cost-effective solutions for diversified network scenarios. It also contains port-based/selective QinQ, VLAN mapping, advanced Access Control List (ACL) and bandwidth management policies that facilitate customized Quality of Service (QoS). Full management and monitoring functionalities including IEEE802.3ah, IEEE802.1ag and ITU-T Y.1731 are implemented to guarantee SLA as fundamental modules in both products. In addition, the manageable ISCOM2100-PWR series Carrier Ethernet PoE switches provide 8-24 PSE+ Fast Ethernet downlink access interfaces (up to 30 Watts per port) with 2/4 x Gigabit combo uplinks. The ISCOM2100-PWR PoE switches offer a power supply for power demand (PD) devices such as wireless Access Point (AP).

ISCOM2110EA-MA

ISCOM2110EA-MA-PWR

ISCOM2128EA-MA

ISCOM2128EA-MA-PWR

FEATURE

- Supports VLAN, QinQ, ACL per port/VLAN/CoS
- Supports IEEE802.3ah, 802.1ag, ITU-T, Y.1731/SLA
- Supports IGMP, MVR, Multicast-filtering, DHCP, IPv6 and TACACS+
- Power supply redundancy via RPS module (ISCOM2128G series ONLY)
- STP and Ethernet Ring (50ms switch-over)
- CLI, Telnet and SNMP (NView compatible)
- CE1.0-certified E-Line and E-LAN services, and CE2.0-compliant E-Line, E-LAN, E-TREE and E-Access services

P/N	ISCOM2110EA-MA	ISCOM2110EA-MA-PWR	ISCOM2128EA-MA	ISCOM2128EA-MA-PWR
WAN Interface	2 x 100/1000M Base-X SFP interfaces		4 x combo GE interfaces	
LAN Interface	8 x 10/100/1000M Base-T RJ45 ports		24 x 10/100M Base-T RJ45 ports	
PoE	N/A	802.1af/at	N/A	802.1af/at
Ring protection	STP; Raisecom Ethernet Ring		G.8032 ERPS	
Power	Single AC/DC		Power supply redundancy via RPS module	

Chapter 2. Optical Transport Network

Optical Transport Network (OTN) mainly addresses the ever-increasing bandwidth demands, not only for data service but also for transmission, such as mobile backhaul, fronthaul and xPON extension. It integrates functionalities of transportation, multiplexing, switching, protection and management of customer traffic. An increasing interest in compact OTN hase been observed for the past few years, where the drastic growing bandwidth demands for public or private Clouds, SDN and Big Data push the access rate gradually from FE to GE and even 10G. In addition, in the new FTTH and 4G era, OTN conveys vast benefits for the carrier to save on OpEx and fiber resources by using the Mobile fronthaul and xPON distance extension applications.

Multi-Service OTN Platform

iTN8600

Optimized for aggregation, transmission and multi-service hub deployment, the iTN8600 was enhanced to expand the current functionality and scale for Raisecom's Optical Transport solutions. Designed for high-speed packet and the migration of legacy TDM to packet, the iTN8600 offers advanced OTN-based packet switching and transport capabilities. Primarily targeting metro-edge aggregation towards the core, this cost-effective product enables aggregation over OTN. Therefore, allowing service providers to plan their bandwidth scalability. It supports SDH/SONET services, GE/10GE/OTU1/OTU2/OTU2e data service and other data services with bits rate ranging from 2Mbps to 2.7Gbps aggregating to OTU2/OTN2e and contains 120G packet switching capabilities. An additional (more important) application motivated by iTN8600 is the mobile fronthaul, which is a key issue for mobile operators to minimize the OpEx and enlarge radio coverage. It allows carriers to multiplex 2/3/4G CPRIs up to 30 into transponder to extend over 25km. Raisecom's new designed chip in this system can multiplex 8 EPON or 4 GPON OLT ports into 1 OTU2 and OTU2 and can be transmitted over a WDM or OTN network over 45km to extend xPON coverage and save fiber up to 90%. Compatible with Raisecom's iTN series products, iTN8600 can be deployed in a point to point and ring topology for various applications. These include, Service provider aggregation, government, enterprise and business connection, mobile backhauling and Big Data connectivity. The product can be managed by a GUI-based NView NNM system to simplify configuration and monitor performance in real time.

iTN8600 System

FEATURE

- Universal switching and flexible grooming for OTN, SDH, and packet services
- Up to 8~16 x any rate service or 16 x GE and 2 x 10GE aggregate to 2 x OTU2
- Supports 120G packet switching capability
- All service access capability, including E1, STM1/4/16/64, OC-3/12/48/192, FE/GE, 10GE LAN, 10GE WAN and OTU1/OTU2
- Supports EP-Line, EVP-Line, EP-Tree, EVP-Tree, EP-LAN, EVP-LAN
- Supports 40G OTN cross-connection based on ODU and ODU1
- Supports static LSP, L2VPN and VPLS
- Supports up to 20G cross-connection based on VC4 or 10G cross-connection based on VC3/VC12
- Supports G.8113.1 OAM, 802.1ag/Y.1731/SLA OAM and 802.3ah OAM
- Supports 8x1.25G over OTU2 and 4x2.5G over OTU2 multiplexer
- Supports transponder with 5 OTU2 ports on each card
- Supports system management card and power supply module redundancy
- Supports Auto Laser Shutdown (ALS) protection and Dying Gasp
- Redundancy and reliability with one plus one MSP and LPP on OTN side, ITU-T G.8031 (ELPS), G.8032 (ERPS) and LAG protection on Ethernet side, MPLS-TP linear, ring and dual-homing protection on PTN side and 1+1 MSP, SNCP, 1+1 LPP on SDH side
- SNMP (NView compatible) via in-band and out-of-band network channels

System and Sub-cards

- iTN8600-II-DC, 2U/11 slot chassis
- RPD1351-S-48S48, -48V power card
- iTN8600-II-NXU, system management and control card
- iTN8600-AO2D, OTU2 aggregation card with 8 x SFP interface for any services and 2 x OTU2 SFP/XFP interface
- iTN8600-EM2D, OTU2 aggregation card with 16 x GE/FE SFP interface, 2 x 10GE XFP interface at client side and 2 x OTU2/OTU2e/10GE XFP interface at line side
- iTN8600-XD2D, OTN tributary card with 2 x OTU2/OTU2e/10GE LAN/10GE WAN/STM64 SFP interface at client side and 2 x OTU2/OTU2e XFP interface at line side
- iTN8600-PG8, GE tributary card with 8 x GE/FE SFP interface
- iTN8600-PX2, 10GE tributary card with 2 x 10GE XFP interface
- iTN8600-SH2, SDH aggregation card with 2 x STM16 SFP interface
- iTN8600-SS4, SDH tributary card with 4 x STM1/4 SFP interface
- iTN8600-SG16, EOS tributary card with 8/16 x GE/FE SFP interface and 2 x STM4 SFP interface
- iTN8600-PE16, E1 CEs sub card to access 16 E1 service simulate to packet service
- iTN8600-PG16E, 8 SFP interface to support 16 FE/GE services, can be used independently or work in pairs with NXU card
- iTN8600-OLP, optical line one plus one protection, can be applied for protection purposes at the client side, line side and multiplex section
- iTN8600-OTU5, 5 paths of two-way wavelength transfer, can be applied for point to point, CWDM, DWDM, and so on.

Chapter 3. IP MPLS

The IP-MPLS is introduced to the carrier for leveraging between a high bandwidth demand and a dedicated SLA. Decades ago, the IP-MPLS was introduced, influencing the carrier to start from a core network for a dedicated network or a long distance transmission. Due to the high cost and very sophisticated configuration, the IP-MPLS cannot be implemented end to end for a business service. The MPLS tunnel is terminated on the provider edge router and extends the business service by Ethernet. No carrier will question the amount of benefits the IP-MPLS conveys . Theonly concern is the deployment of an end to end IP-MPLS product at a reasonable cost.

IP-MPLS PE Product

iTN8800

This medium size IP-MPLS PE router is mainly used for many applications such, as backhaul FTTH, leased line services, mobile backhaul, wholesale businesses such as, aggregation devices on a carrier network. Raisecom offers one cost effective IP-MPLS PE router to a carrier, which fully supports all functionalities and IOP with multi-vendors in an existing core or aggregation network. The Raisecom PE router also brings benefits to support TDM PWE3 to aggregate all the legacy TDM services on customer premises. It provides an alternative solution to fulfill all the IP-MPLS features and services for a campus network, private network or utility network, and more.

iTN8800 System

FEATURE

- Stable and reliable network assurance with redundant power supplies, NMS cards
- Supports OSPF, ISIS and BGP route protocol
- Supports BFD for OSPF, OSPF for MPLS-TE and CSPF
- Supports global/interface LLDP
- Supports global/interface RSVP-TE
- Supports dynamic ARP learn function
- Supports global/interface LDP
- Supports MPLS L3VPN
- Supports L2 and L3 SLA
- Supports L3 VPN QoS

System and Sub-cards

- iTN8800-II-DC, iTN8800-II chassis (includes fan & power module)
- iTN8800-II-NXU, iTN8800-II management & control module
- iTN8800-RG8, iTN8800 8 x GE module
- iTN8800-RX2, iTN8800 2 x 10GE module
- iTN8800-RE16, iTN8800 16 x E1(CES-E1) module
- iTN201-4GF-R, 4 x GE line interfaces, 6 x GE SFP, client interfaces/12 x GE TSFP, client interfaces
- iTN201-4GE-R, 4 x GE RJ45 interface,1000BaseT/100Base-T

IP-MPLS CPE Product

ISCOM RAX711-R, iTN201-R

IP/MPLS CPE typically contains the same functionality as the PE router, with a smaller capacity and performance. Raisecom offers the best breed of IP/MPLS and CE to access customers by an end-to-end MPLS tunnel guaranteeing the best VPN performance conveying all the MPLS VPN benefits to the customers. The most important benefit is the RAX711-R, which is the most compact and cost effective MPLS CE providing the customer with an affordable MPLS product at an affordable cost for additional corporate users. Raisecom introduces an outstanding solution to replace the legacy TDM based leased line services with the same quality at a lower cost, based on the price/bandwidth ratio. It reduces the issues of the carrier losing performance and monitors the capability to implement a Layer2 Ethernet device for saving costs. In addition, it improves the service consistency on the customer's premises with the MPLS tunnel, instead of a low performance Layer3 router. It can work with the RAISECOM IP/MPLS PE router or interoperate with any other vendors on the existing MPLS aggregation network.

ISCOM RAX711-R

iTN201-R

P/N	ISCOM RAX711-R	iTN201-R
Interfaces	2 x GE SFP Interfaces uplink, 4 x GE Electrical Interfaces downlink / 4 x GE Combo Interfaces downlink; 4 x E1 Interfaces	Console Interface, SNMP Interface, 4 x GE SFP interfaces uplink, 6 x SFP/TSFP Interfaces downlink; 4 x GE Electrical Interfaces; 4GE SFP Interfaces; 8 x E1 interface
Technical Standards	ITU-T G.8131, G.8031, and G.8032, G.8113.1, and BFD ITU-T Y.1731, IEEE 802.3ah, IEEE 802.1ag IETF RFC5860 and RFC2544 OSPF, BGP, MP-BGP, and VRRP MPLS, LDP, MPLS-TP, and MPLS QoS, IETF RFC4664 L2VPN framework , VPWS, VPLS, and L3VPN	ITU-T G.8131, G.8031, and G.8032 ITU-T Y.1731, IEEE 802.3ah, and IEEE 802.1ag BFD , ITU-T G.8113.1, IETF RFC5860, and IETF RFC2544 TE FRR and VRRP OSPF, BGP, and MP-BGP MPLS, LDP, and MPLS-TP IETF RFC4664 L2VPN framework VPWS, VPLS, and L3VPN MPLS QoS
Dimensions	220 × 43.6 × 180 mm3	440 × 44 × 266 mm3
Power Consumption	<25W	<60W
Operating Environment	Temperature(°C): -5 °C to 65 °C Humidity: 10%–90% RH	Temperature(°C): -5 °C to 50 °C Humidity: 10%–90% RH

Chapter 4. Packet Transport Network

Increasing demands on bandwidth and versatile services are two influential motivators for the shift from legacy networks to packet transport networks (PTN) and MPLS. Traditional leased line and 2G mobile backhaul businesses still constitute a significant portion of Carrier and ISP revenues. Therefore, the next-generation networks are required to be compatible with existing service models and are required to inherit TDM features including reliability, OAM and synchronization. However, it must still be future-proof to delivery of vast data traffic at an affordable price level, catering for the ever-increasing needs of enterprise users and 3G/4G/LTE MBH applications.

The Raisecom PTN, serving as a robust multi-core system that can carry any services over either SDH or IP/Ethernet infrastructures at the same time, is a perfect choice enabling the transition from TDM to IP to run smoothly. The SDH-like network protection and redundancy requirements are met by supporting G.8031/G.8032 Ethernet and G.8131/Wrapping-Steering MPLS-TP protection protocols with a recovery time of sub-50ms. Advanced management and monitoring are acknowledged by implementing comprehensive 802.3ah, 802.1ag, Y.1731, and SLA. In terms of adaptability of MBH applications, it introduces SyncE and I588v2 as well as pseudo wire technologies.

Dual-Core Architecture PTN Aggregation Platform

iTN2100

iTN2100 is a 6U/15-slot, high-capacity, modular PTN platform with a dual-core architecture for both Ethernet and TDM traffic delivery. It enables a flexible and profitable network establishment for enterprise and mobile backhaul connections, smooth evolution from traditional to next-generation services, and significant reductions of failure points resulting from wiring and cabling. The iTN2100 supports up to 4 x 10G and/or 4 x STM-4/16 uplink capacities, and provides an efficient cross-connection, integration and transportation options over a wide range of copper/fiber based legacy and IP services. The maximum system uptime and Carrier-class network availability are guaranteed by full hardware redundancy, G.8032/G.8031 Ethernet and G.8131/ Wrapping-Steering MPLS-TP protection. Extensive management capabilities are provided for all aspects from equipment installation and service provisioning to real-time system operation and performance monitoring. The iTN2100 offers cost-effective solutions, complying with the CE2.0 Ethernet service models introduced by MEF E1/T1 and 2/4/8-wire SHDSL, fiber multiplexing and pseudowire connectivity for a lease-lined and 2G/3G/LTE mobile backhaul. In addition, the system also supports seamless connections with MPLS-TP and IP-MPLS backbones, and converged fixed-mobile infrastructure by adopting SyncE and 1588v2 PTP. With this integrated system, Carriers and ISPs can save considerable amounts on CAPEX and OPEX for implementing scalable networks and value-added services in the future.

iTN2100

FEATURE

- Combined dual cores can deliver Ethernet and TDM traffic in one system
- Available with 4 x 10G XFP and 4 x GE SFP, or 8 x GE SFP at line side and up to 128 x GE TSFP at client side
- Available with 4 x STM16 SFP or 4 x STM1 SFP at line side and up to 40 x STM1 SFP at client side
- Available with STM-1, EoTDM, PWE3, FiberMux, FE, DS3, E3, E1, Voice, V.35, V.24, RS232, G.SHDSL.bis at client side
- E-Line, E-LAN and E-Tree are compliant with CE2.0 relevant MEF specifications
- Supports uplink redundancy and resiliency with ITU-T G.8031 (ELPS), G.8032 (ERPS) on Ethernet side, G.8131 MPLS-TP liner protection and Wrapping/Steering MPLS-TP ring protection on PTN side and 1+1 liner MSP, SNCP, 1+1 LPP on SDH side
- Supports IEEE802.3ah, 802.1ag, ITU-T Y.1731/SLA, L2MPLS-TP LSP/PW/section OAM
- Supports VLAN, QinQ, QoS, LACP, and static MPLS compliant with MPLS-TP
- PWE3 tributary card supports SAToP, CESoP, MPLS, CESoETH (MEF) and UDP/IP encapsulations
- Supports port statistic based on VLAN/EVC/COS
- Compliant with 1588v2 (PTP) OC/BC/TC mode and SyncE
- Optional 2Mbit, 2MHz input/output external clock
- Provides a non-stop service in case of NMS failures
- Supports full hardware redundant protections for GE, PWE3, SDH, Multi-service FiberMux sub-cards and power supply
- Supports OAM for remote CPE management
- Supports Auto Laser Shutdown (ALS) protection and Dying Gasp
- SNMP (NView compatible) via in-band and out-of-band network channels

System and Sub-cards

- iTN2100-12-A, 6U/15-slot chassis with ventilation modules only
- iTN2100-NMS, system management and control card
- iTN2100-NTU-2XG, 10G aggregation card with 2 x 10G XFP interfaces and 2 x GE SFP interfaces
- iTN2100-NTU-4GF, GE aggregation card with 4 x GE SFP interfaces and 1+1 card protection
- iTN2100-TSU, Clock card providing both IEEE1588(PTP) and SYNC-E
- OPCOM3500E-2STM1/4-M, SDH aggregation card with 2 x STM1 or 2 x STM4 SFP interfaces
- iTN2100-16GF, GE tributary card with 8 x SFP slots supporting 16GF with TSFP-Gb, 16FX with TSFP-03, and 8 x GF with SFP-Gb
- iTN2100-8FX, GE tributary card with 8 x FE SFP interfaces
- iTN2100-4STM1-GC, EoS tributary card with 4 x STM1 SFP and 1 x GE combo interfaces enabling EOS traffic from CPE to be decapsulated directly locally or aggregated to a GE card on a PTN network
- iTN2100-8EOS-8GF, EoS tributary card with 8 x GE SFP interfaces enabling a Gigabit Ethernet service delivery over 8 x VCG
- iTN2100-CES-STM1/4, PWE3 tributary card with 4 x STM1 or 1 x STM4 SFP interfaces
- iTN2100-CES-16E1T1-BL, PWE3 tributary card with 16E1/T1 interfaces

P/N	iTN2100	iTN8600
Chassis(high)	6U	2U
Number of Service slots	13	8
OTN cross-connect	N/A	40G based on ODU0, ODU1
SDH cross-connect	32 x 32 VC4 or 2016 x 2016 VC12	20G based on VC4 or 10G based on VC3/VC12
Packet switch capacity	48G	120G
STM-16 interface	4	8
STM-1/4 interface	4	16
E1 channel	320	N/A
DS3/E3 channel	30	N/A
PDH optical tributary channel	40	N/A
EOS interface	80	64 x GE/FE + 8 x STM4
FE port	80	32
GE port	352 x GE for tributary, 16 x GE for aggregator	32
10GE port	4	8
PWE3	8 x STM4/32 x STM1	6 x STM4/24 x STM1
	128 x E1/T1	64 x E1/T1
OUT/OTU2e interface	N/A	4
G.SHDSL interface	80	N/A

TDMoP

RC1201-2GE16E1T1, RC1201-4FE4E1T1(-O), RC1201-2FEE1T1, RC1201-2FEV35

RC1201-2FEE1T1

RC1201-4FE4E1T1

RC1201-2GE16E1T1

When working in pairs or with aggregation nodes, the RC1201 series can extend the TDM traffic transparently over the Ethernet, UDP/IP, MEF or MPLS Packet Switched Networks (PSNs). The large configurable jitter buffer enables smooth compensation for the delay variation introduced by the PSN. All devices support four clock modes and two Ethernet payload encapsulations. The aggregation models offer an optional clock sub-card to recover the external clock. The RC1201 series supports advanced traffic management such as flow control, fault propagation, rate-limit, tagging, stacking and filtering (in addition to a full suite of OAM functionality). All the PWE3 demarcation devices support in-band and out-of-band management, and can be configured locally via CLI, Telnet, or SNMP (NView compatible).

P/N	RC1201-2GE16E1T1	RC1201-4FE4E1T1	RC1201-2FEE1T1	RC1201-2FEV35
Interface	Client: 16 x E1/T1 + 8 x GE (GE cards are inserted in 2 expansion slots) Line: 2 x GE SFP Management: 1 x Console + 1 x SNMP	Client: 4 x FE + 4 x E1/T1 Line: 1 x GE SFP Management: 1 x Console + 1 x SNMP	Client: 2 x FE + 1 x E1/T1 Line: 1 x GE SFP Management: 1 x Console + 1 x SNMP	Client: 2 x FE + 1 x V.35 Line: 1 x GE SFP Management: 1 x Console + 1 x SNMP
MTU	12,288 Bytes	1632 Bytes		
Ethernet	16k MAC, VLAN, QinQ	8k MAC, VLAN, QinQ		
IP service	N/A			
MPLS-TP	64 PW			
TDM PW encapsulation	MEF8, MPLS-TP, UDP/IP, SAToP, CESoPSN	MEF8, MPLS-TP, UDP/IP, SAToP, CESoPSN, HDLC and AAL1		MEF8, MPLS-TP, UDP/IP, SAToP, HDLC and AAL1
TDM interface	Unframed and framed modes			V.35 phase and clock mode configurable Bandwidth: Nx64Kbit/s (N=1~64)
Clock/Synchronization	Internal/slave/adaptive clock configurable			Internal/loopback/ adaptive clock configurable
Traffic Management	Stream-marked based on CoS and DSCP, SP, WRR and DRR queue schedule and 8 queues per port Rate limit per port/VLAN	Stream-marked based on Cos and DSCP, SP and WRR queue schedule and 4 queues per port, Rate limit per port		
Ethernet OAM	IEEE802.3ah OAM			
Reliability & Protection	Link aggregation group Loop detection per port/ VLAN	Link aggregation group Loop detection per port		
Security	ACL based on MAC Storm control (broadcast, multicast, DLF)			
System Management	CLI, Telnet and SNMP (NView compatible)			

Chapter 5. xPON

Optical fiber networks have gradually replaced copper cables from core to access network infrastructure, and are mainly deployed in residential applications, in addition to long-haul and residential scenarios. The passive optical network (PON) technology mainly addresses the point-to-multipoint connections from the Point of Presence (POP) to the customer premises. It brings an appealing business case for massive deployments of triple-play services with optimized CAPEX and OPEX, particularly when limited fiber resources exist, to implement point-to-point active optical networks. The EPON and 10G-EPON standards introduced by IEEE, in comparison with the GPON and XG-PON standard introduced by ITU, are two of the most popular PON technologies. The former offers a GE or 10G symmetric bit rate, while the latter offers asymmetric 2.5GE/10G downstream and 1.25GE/2.5GE upstream bit rates. According to FTTH authorities, there will be a growing trend in symmetrical bandwidth requirements over the next ten years.
The Raisecom PON profile consists of high-density to standalone OLT chassis and diversified ONU models for subscribers in single family units (SFUs) and multi-dwelling units (MDUs). The Raisecom PON system enables a uniform transmission of native Ethernet services from backbones to the "last mile". The products ensure easy provisioning, easy management, high performance and network redundancy, and guarantee a profitable business case for FTTX network builders.

XPON OLT

ISCOM6800

ISCOM6800 is a 13U high-density integrated platform compatible with both IEEE802.3ah EPON and ITU-T G.984 GPON standards. The system can aggregate a maximum of 14,336 ONUs/ONTs with a typical 1:64/1:128 split ratio. ISCOM6800 also possesses great switching capacities, and can be used to aggregate and transport data, voice and video traffic from other OLTs over Ethernet backbones. Enhanced network manageability, reliability and redundancy are supported with Ethernet OAM, CFM functions, ring protection mechanisms, and a hot-swappable redundant power supply. ISCOM6800 also supports multi-purpose access and aggregation PON and xDSL traffic at the same time.

ISCOM6800

FEATURE

- Available with mixed pluggable up to 224 x GE or 8 x 10GE interfaces for uplink, and up to 112 x GPON or 224 x EPON interfaces for downlink
- Supports 2 x SMC control module supporting real-time redundancy
- Supports up to 1:64/1:128 split ratio, and 14,336 ONUs per full-load 10U OLT chassis
- Supports upstream wavelength of 1310nm and downstream wavelength of 1490nm
- IEEE 802.3ah (EPON), ITU-T G.984 (GPON), IEEE 802.3av (10G EPON)
- Symmetrical 10G/10G or asymmetrical 10G/1G
- Supports storm control of broadcast, multicast and DLF
- Supports trunk group and Link Aggregation Control Protocol (LACP)
- Supports one-plus-one automatic protection and link diagnostic for each PON port
- Supports VLAN, QinQ, QoS, DBA and a reliable SLA
- Supports IEEE802.3ah/802.1ag, ITU-T Y.1731/SLA/G.984
- Supports IGMP, Multicast VLAN Registration (MVR), DHCP and Option 82
- Supports AES-128 encryption and triple churning
- Hot-swappable redundant power supply
- CLI, Telnet, SSHv2 and SNMP (NView compatible)

System and Sub-cards

- ISCOM6800-18-A, 13U/18-slot chassis with an airflow slot and only a cable array.
- ISCOM6800-SMCA, system management and control card with a switching capacity of 1.28Tbps
- ISCOM6800-SMCB, system management and control card with a switching capacity of 640Gbps
- ISCOM6800-EP16, EPON service card with 16x EPON SFP interfaces
- ISCOM6800-EP12, EPON service card with 12x EPON SFP interfaces
- ISCOM6800-GP8A, GPON service card with 8x GPON SFP interfaces (under development)
- ISCOM6800-XP4A, 10GE service card (semi-card) with 4 x 10GE XFP plus and interfaces
- ISCOM6800-XP2A, 10GE service card (semi-card) with 2 x 10GE XFPand interfaces
- ISCOM6800-GE16, GE service card with 16 x GE SFP interfaces
- ISCOM6800-CICA, environment monitoring card

EPON OLT

ISCOM5800E

The ISCOM5800E is a 7U medium-sized OLT system in the Raisecom EPON portfolio. It provides a cost-effective solution for triple-play service delivery in distributed rural residential areas with powerful routing and switching capabilities. In addition, it can be a part of a concentrated transportation ring and aggregated standalone OLT or up to 2,560 ONUs at a split ratio of 1:64. The ISCOM5800E is future-proof for growing bandwidth demands, and assists the FTTH network creaters to leverage capital and operational costs.

ISCOM5800E

FEATURE

- Available with a mixed pluggable module up to 40 x GE and 4 x 10GE interfaces for uplink and up to 40 x EPON interfaces for downlink
- Supports 2 x SMC control module supporting real-time redundancy
- Supports up to 1:64 split ratio, 20km transmission distance and 2,560 ONUs per full-load 6U chassis
- Supports upstream wavelength of 1310nm and downstream wavelength of 1490nm
- Supports ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) with a sub 50ms recovery time
- Supports storm control of broadcast, multicast and DLF
- Supports trunk group and Link Aggregation Control Protocol (LACP)
- Supports one-plus-oneautomatic protection and link diagnostic for each PON port
- Supports VLAN, QinQ, QoS, DBA and assured SLA
- Supports IEEE802.3ah, 802.1ag, ITU-T Y.1731/SLA
- Supports IGMP, Multicast VLAN Registration (MVR), DHCP and Option 82
- Supports AES-128 encryption and triple churning
- Hot-swappable redundant power supply
- CLI, Telnet, SSHv2 and SNMP (NView compatible)

System and Sub-cards

- ISCOM5800E-15-A, 7U/15-slot chassis with integrated ventilation module only
- ISCOM5800E-SMCB, system management, and control card containing a switching capacity of 176Gbps
- ISCOM5800E-EP4A, EPON service card with 4 x EPON SFP interfaces
- ISCOM5800-2PON, EPON service card with 2 x EPON SFP interfaces
- ISCOM5800E-GE8A, GE service card with 8 x GE SFP interfaces
- ISCOM5800-4GE, GE service card with 4 x GE combo interfaces
- ISCOM5800-2GE, GE service card with 2 x GE combo interfaces
- ISCOM5800E-10GEX2-2GE, 10GE service card with 2 x 10GE XFP and 2 x GE SFP interfaces
- SUB-PWRM-DC, intelligent power supply card with voltage monitoring and alarm, -48V DC
- SUB-PWRM-AC, intelligent power supply card with voltage monitoring and alarm, 220V AC

Standalone EPON OLT

ISCOM5508

The ISCOM5508 is a full modular compact EPON OLT device typically applied to a business E-LAN, E-Line service delivery, or triple-play extensions for residential areas with a small population. The product offers broad management and monitoring features by supporting 802.3ah EFM, 802.1ag CFM and Y.1731/SLA. Enhanced network security is also achieved using 802.1x, RADIUS and TACACS+ authentication processes. The ISCOM5508 can support a transmission distance of up to 20km and 768 ONUs with a split ratio of 1:64. Its modular design ensures flexibility for future expansions and upgrade with a low TCO.

ISCOM5508

FEATURE

- Available with 6 x GE interfaces for uplink and 12 x PON ports for downlink
- Supports up to 1:64 split ratio, 20km transmission distance and 768 ONUs per full-load 1U chassis
- Supports an upstream wavelength of 1310nm and downstream wavelength of 1490nm
- Supports storm control of broadcast, multicast and DLF
- Supports trunk group and Link Aggregation Control Protocol (LACP)
- Supports 1+1 automatic protection and link diagnostic for each PON port

- Supports VLAN, QinQ, QoS, DBA and a reliable SLA
- Supports IEEE802.3ah, 802.1ag, ITU-T Y.1731/SLA
- Supports IGMP, Multicast VLAN Registration (MVR), DHCP and option 82
- Supports Radius and TACACS+
- Hot-swappable redundant power supply
- CLI, Telnet, SSHv2 and SNMP (NView compatible)

P/N	ISCOM6800	ISCOM5800E	ISCOM5508
Ethernet Interface	Up to 224 x GE or 8 x 10G interfaces	Up to 40 x GE and 4x10G interfaces	Up to 6 x GE interfaces
EPON Interface	Up to 224 x EPON interfaces	Up to 44 x EPON interfaces	Up to 12 x EPON interfaces
GPON Interface	Up to 112 x GPON interfaces	N/A	N/A
ONUs	Supports up to 14,336 ONUs/ONTs	Supports up to 2,560 ONUs	Supports up to 786 ONUs
Split Ratio	1:64 – EPON 1:128 – GPON		1:64
Transmission Distance	20km		
VLAN	Supports VLAN, QinQ, QoS, DBA and assured SLA		
TCP/IP	Supports IGMP, Multicast VLAN Registration (MVR), DHCP and Option 82		
Ethernet Ring	N/A	Supports ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) with a 50ms recovery time	N/A
OAM	Supports IEEE802.3ah, 802.1ag, ITU-T Y.1731/SLA		
Security & Reliability	Supports storm control of broadcast, multicast and DLF • Supports one-plus-one automatic protection and link diagnostic for each PON port • Supports AES-128 encryption and triple churning		Supports storm control of broadcast, multicast and DLF • Supports one-plus-one automatic protection and link diagnostic for each PON port • Supports Radius and TACACS+
Management	CLI, Telnet, SSHv2 and SNMP (NView compatible)		

EPON ONU

ISCOM HT803-1GE/803/803-SR/803-W

The Raisecom EPON ONU family, ISCOM HT803, is a series of plastic-box ONUs typically applied to residential triple-play services. It offers a wide selection of Gigabit to Fast Ethernet interfaces, POTS (FXS), CATV RF interfaces and Wi-Fi. This series supports management via SNMP and can work seamlessly with Raisecom OLTs to deliver high-quality voice, data and CATV services. The ISCOM HT803-W, in particular, can act as a wireless home gateway and can sustain up to 4 SSIDs.

ISCOM HT803-1GE

ISCOM HT803

ISCOM HT803-SR

ISCOM HT803-W

P/N	ISCOM HT803-1GE	ISCOM HT803	ISCOM HT803-SR	ISCOM HT803-W
WAN Interface	1 x PON port, up to 20km transmission distance at maximum symmetric rate of 1.25Gbps			
LAN Interface	1 x GE interface	4 x FE interfaces		1 x GE and 3 x FE interfaces
POTS	N/A		N/A	2 x FXS
CATV	N/A		1 x RF	N/A
USB	N/A			1 x USB2.0
WLAN	N/A			Home gateway. Support wireless 802.11b/g/n and allows up to 4 SSIDs
VLAN, QinQ	Supports VLAN, QinQ, QoS, DBA and a reliable SLA			
Resiliency	Supports link diagnostic for each PON port			
Security	Supports storm control of broadcast, multicast and DLF			
OAM	Supports IEEE802.3ah, 802.1ag, ITU-T Y.1731/SLA			
Multicast	Supports IGMP v1/v2/v3			
Management	CLI, Telnet, Web management and SNMP (NView compatible)			

Standalone GPON OLT

ISCOM5508-GP

The ISCOM5508-GP is a compact GPON OLT with enhanced functionality compliant with the GPON's ITU-T G.984 standard. The device can support up to 8 GPON, 10 GE and 2 x 10GE interfaces. The complete modular design of the ISCOM5508-GP enables excessive flexibility in deploying, maintaining and expanding services at reduced CAPEX and TCO. Designed for large enterprises, SME and residential fiber access, the ISCOM5508-GP offers a broad range of featuresdelivering triple-play services, simplifying management, and providing high network reliability. Security is assured by implementations of RADIUS and/or TACACS+, while maximum network uptime is guaranteed by a ring protection mechanism, real-time monitoring and hot-swappable redundant power supplies. In parallel, the ISCOM5508-GP device supports multi-purpose access and aggregation PON and xDSL traffic.

ISCOM5508-GP

Sub-cards

- ISCOM5508-GP4A: GPON expandable slot
- ISCOM5508-GE4B: GE expandable slot
- RPA1101-SI-220S12-Fn: hot-swappable AC power supply
- RPD1101-48S12-Fn: hot-swappable DC power supply
- FANS306: Hot-swappable intelligent fan

FEATURES

- Available with up to 12 x GE and 2 x 10G interfaces, or 8 x GPON ports
- Supports up to 1:128 split ratio, 20km transmission distance and 1,024 ONUs per full-load 1U chassis
- Supports an upstream wavelength of 1310nm and a downstream wavelength of 1490nm
- Supports VLAN, QinQ, QoS, DBA and SLA
- Supports Link diagnostic, port backup/isolation/protection/monitoring, bi-directional FEC
- Supports ARP, DHCP relay, DHCP v4/v6, IGMP snooping v1/v2/v3, IPv4, IPv6
- Supports ACL based on MAC, ACL map, port-based mirroring
- Supports Anti-DDoS, RADIUS, TACACS+, Storm control
- Supports RIP v1/v2, OSFP, Service classification per port/VLAN/CoS (DSCP),
- Supports SP, WRR, DRR and SP+WRR scheduling modes
- Supports SFP digital diagnostic (DDM), FAN, CPU, voltage and temperature monitoring
- ITU-T G.984 (GPON), ITU Y.1731/SLA Services OAM, ITU-T G.8021
- CE and RoHS compliant, RMON I and II standards
- CLI, Telnet, SSHv2 and SNMP (NView compatible)

GPON ONT

ISCOM HT803G-1GE/803G/803G-W/803G-U

The Raisecom GPON optical network terminal (ONT) series is ideal for residential access with high speed data, IPTV, voice and CATV services compliant with the ITU-T G.984 standard. It offers flexible choices in terms of downlink types and numbers, such as, GE/FE auto-adapting Ethernet ports, POTS (FXS) interfaces, RF port and Wi-Fi function compliant with IEEE 802.11b/g/n. All GPON FTTX ONUs are consistent with advanced end-to-end management and monitoring functionality, and can be synthesized under the Raisecom NView platform. In particular, the Raisecom ONU is specifically designed for Ethernet data services, voice over IP, IPTV, CATV, wireless router accessing and convenient USB2.0 home network storage connections for various application scenarios such as residential triple-play service and business connections.

ISCOM HT803G-1GE

ISCOM HT803G

ISCOM HT803G-W

ISCOM HT803G-U

P/N	ISCOM HT803G-1GE	ISCOM HT803G	ISCOM HT803G-W	ISCOM HT803G-U
WAN Interface	1 x PON port, up to 20km transmission distance with a 2.5G downstream and 1.25G upstream rates			
LAN Interface	1 x GE interface	4 x GE interfaces		
POTS	N/A		2 x FXS	
CATV	N/A		N/A	1 x RF
USB	N/A		1 x USB2.0	
WLAN	N/A		Home gateway. Support wireless 802.11b/g/n and allow up to 4 SSIDs	
VLAN, QinQ	Supports VLAN, QinQ, QoS, DBA and assured SLA			
Resiliency	Supports link diagnostic for each PON port			
Security	Supports storm control of broadcast, multicast and DLF			
OAM	Supports IEEE802.3ah, 802.1ag, ITU-T Y.1731/SLA			
Multicast	Supports IGMP v1/v2/v3			
TCP/IP	N/A		Supports PPPoE, NAT, NAPT and DHCP	
Management	Telnet, CLI and SNMP (NView compatible)		Web management, Telnet, CLI and SNMP (NView compatible)	

PON Extender

ISCOM GPR01/ISCOM EPR01

ISCOM GPR01 /ISCOM EPR01 are used in GPON/EPON to extend distance up to 45km. They are used to amplify an optical signal between OLT and ONU in ODN link, to extend transmission distance and increase optical ratio.

The ISCOM GPR01 /ISCOM EPR01 adapt the OEO (Optical Electrical Optical) regeneration technology to recognize 3R (Regeneration, Reshaping, Retiming), amplify GPON line optical ratio, extend transmission distance, and increase the splitter ratio. The device is small and exquisite, easy to install, and can be widely applied in GPON/EPON system markets, such as, broadcast network, carrier network, electricity and traffic network, enterprise network and more.

ISCOM EPR01

ISCOM GPR01

FEATURES

- To amplify signal and realize 3R amplifying
- Extending transmission distance up to 45km
- To increase optical splitter ratio

P/N	ISCOM GPR01	ISCOM EPR01
Dimension	200 x 130 x 32 mm3	100 x 100 x 25 mm3
Weight	0.75kg	0.25kg
Consumption	10W	4W
Transmission Distance	40km	45km
Central Wavelength	1310nm Tx, 1490nm Rx	
Transmission Speed	1.25Gbit/s uplink and 2.5Gbit/s downlink	1.25Gbit/s uplink burst signal and 1.25Gbit/s downlink continued signal
Standard	ITU-T G.984.x	N/A
OLT Interfaces	Rx sensitivity: -28dBm Min. overload: -8dBm Tx optical power: 0.5dBm~5dBm	Rx sensitivity: -27dBm Min. overload: -3dBm Tx optical power: -1dBm~4dBm
GSFP optical module	Rx sensitivity: -28dBm Min. overload: -8dBm Tx optical power: 1.5dBm~5dBm	Rx sensitivity: -30dBm Min. overload: -6dBm Tx optical power:2dBm~7dBm

CATV EDFA

OPCOM100-OAU-H

The fiber amplifier is a 2U rack-mount device with a dual-power backup chassis. It provides 16 or 4 data ports and 1 CATV port input, simultaniously, and 16 or 4 data + CATV mixed signal output ports. Users from the remote side can query and configure the states and parameters through the display of the Raisecom's panel, control button and NMS.

OPCOM100-OAU-H

FEATURES

- Automatic Power Control allows maintaining constant output power of the amplified optical signal
- Power supply board, network management board and fan board supports hot-plugging
- Working wavelength between 1540nm~1565nm
- Er-Yb co-doped double-clad amplifier: Pump leaks processing technology
- High stability and reliability: MTBF >17 Years
- Intelligent temperature control system
- Supports remote network management
- Saturated output total power: typical value 1.0 W; Input power: -3~ +10dBm
- Noise coefficient: Max. 6dBm
- Input and output pump leakage: -35dBm and -45dBm
- Return loss: Max. -45dBm
- Polarization Dependent Gain: Max. 0.3dBm
- Polarization Mode Dispersion: Max. 0.5ps

Splitter

Passive Optical Splitter

The optical splitter is a passive optical plug-and-play device, which connects OLT and ONUs with multiple fiber ends. It is generally deployed in an optical distribution network, allowing carriers to split optical signals to numerous customer premises. Raisecom provides various optical splitters with the following split ratios: 1:2, 1:4, 1:8, 1:16, 1:32, 1:64 to 1:128. The series is classified as indoor, indoor/outdoor and outdoor optical splitters.

Outdoor Optical Splitter

Indoor/Outdoor Optical Splitter

Chapter 6. SME Router

The expansion of small and medium enterprise user groups requires special types of services which are different from those of the residential users and large enterprises. The Raisecom MSG series solution assists in lowering costs, while providing manageability, increased bandwidth and a secure connection among employees working in a small office using a large number of network devices.

The wireless connectivity enables employees to access all the required business applications while at their desks or in meeting rooms. It also provides complete IP telephony to be delivered in the single data network. The Raisecom MSG series allows the customer to extend highly secure network connectivity to guests in a variety of locations, such as a hotel, an office lounge, or any other area open to nonemployee users. Using powerful, but easy-to-configure security and traffic segmentation capabilities, vital business traffic is isolated from guest services and keeps guests' network sessions totally separate from each other.

High Security Data Access for SME

MSG2110-SHDSL

With the symmetrical data transmission of up to 15 Mbps over the 2-wire line, the G.SHDSL.bis satisfies the needs of multiple users, who require both bandwidth and permanent data connections. MSG2110 is a router with G.SHDSL uplinks. It is cost-effective and extends multiple Ethernet services on the existing copper lines. It may act as the gateway of a small and medium enterprise to connect to the Internet with a wide range of IP and security functions. The flexible configuration on the QoS enables SME customers to define the different flows such as VoIP, video and data with a guaranteed or maximum bandwidth allocation. This device works on the demarcation point between the carriers and customers and saves the SME customers the cost of buying additional small routers for their security and routing requirements. If the EPL and EVPL are required for a much larger organizations and branches, it can also deliver a Layer 2 carrier Ethernet service for point to point access.

MSG2110-SHDSL-2W/4W/8W

FEATURES

- Supports static/dynamic routing (RIP) as well as OSPF
- Supports IPSec, SSL and L2TP VPN, Content filtering
- Anti-DoS, Anti-ARP function
- Supports NAT/NAPT, DHCP and DNS/DDNS
- Supports VLAN, QoS and SLA
- Supports IEEE802.3ah, 802.1ag and ITU-T Y.1731/SLA
- Supports TR069, CLI, Telnet, Web management and SNMP (NView compatible)

Data and VoIP for SOHO/Home

MSG1200-GEC

The Raisecom MSG1200-GEC provides solutions, which satisfies the demands of SOHO and Home users. The device offers flexible uplink options, including GbE combo ports and is ideal for concurrent services with stringent performance requirements, such as routing, bridge, NAT/NAPT, DHCP, VPN, Anti-Dos, Access Control ability, VoIP, Anti-Port scanning and IEEE 802.11b/g/n. In addition, it also offers 1 x USB2.0 interfaces, which can be used for either data storage or 3G/4G USB modems of authorized vendors. Two telephone service lines are provided using VoIP technology with the SIP or H.248 signaling protocol. The device features quick responses, prompt delivery, rapid networking deployment capabilities, as well as resilient performance and exceptional compatibility with multi-types of services while greatly reducing both equipment and management costs.

MSG1200-GEC

FEATURES

- Available with combo GE port at WAN side: 1 x 10/100/1000M Base-T and 1 x 100/1000M Base-X GbE optical port for additional SFP
- Available with 1 x 10/100/1000M Base-T and 3 x 10/100M Base-T at LAN side
- Available with 2FXS ports at LAN side
- Available with 1 x USB interface on the front panel
- Supports static/dynamic routing (RIP) as well as OSPF
- Supports IPSec, SSL and L2TP VPN, Content filtering
- Anti-DoS, Anti-ARP function
- Supports NAT/NAPT, DHCP and DNS/DDNS
- Supports VLAN, QoS and SLA
- Supports RFC 3015, 3425, ITU-T H.248.v1/v2/v3
- Supports voice CODECs like G.711, G.726, G.729AB, BV16, ILBC, T.38, etc.
- Supports RTP / RTCP: RFC 3550, RFC 3551
- Supports IEEE 802.11b/g/n connections
- Supports TR069, CLI, Telnet, Web management and SNMP (NView compatible)

Chapter 7. Industrial Switch

As the Ethernet technologies mature, Industrial Ethernet products and solutions are gaining popularity in the vertical industrial, utility, transportation and public marketplaces for their core values of enhanced manageability, network redundancy, scalable bandwidth up to GE and 10G, and comprehensive performance monitoring. In addition, the managed Ethernet technologies, which are introduced into industrial applications assist with the integration of many systems over an expandable network across wired and wireless LANs and WANs.
The Raisecom Gazelle series is designed to meet strict industrial demands of mission-critical applications, such as the smart grid industry, traffic control and surveillance systems. The carefully selected L2 Gigabit and Fast Ethernet models support advanced QoS, enhanced network security, resiliency and reliability, and are applicable for a wide range of industry and business connections under tough conditions. In compliance with IEC 61580-3 and IEEE 1613, the series guarantees the highest standards of EMI immunity and error-free communication, which is generally required for intelligent power plants, substations, transmission lines and ammeter readings. Reinforced hardware design, 50ms ring protection and power redundancy further increase network reliability and greatly reduce the cabling and wiring complexity.

L2 DIN-Rail Manageable Industrial Switch

Gazelle S1010i/S1020i/S1112i-PWR/S1508i/S1508i-PWR

The Gazelle S10xxi series consists of cost-effective, compact and manageable industrial switches with a wide selection of port numbers, speed and media types. These access switches enable delivery of reliable, continuous, and manageable services by complying with several industrial regulations and standards. Network and power redundancy are also included to ensure maximum uptime. The Ethernet redundant ring can be supported at any interface with a recovery time of sub-50ms. In addition, the Gazelle S1112i-PWR supports the POE function with at least 4 IEEE802.3at ports or 8 IEEE802.3af ports. The Gazelle S1508i-PWR supports POE function with 4 IEEE802.3at ports or 4 IEEE802.3af ports. Products in the series use IP40 housing and fanless design with a wide operating temperature ranging from - 40 to 85˚C. This switch supports DIN rail, wall mounting and rack mounting. The Gazelle S1508i is a Full-Gigabit Layer 2 Din-Rail manageable industrial switch, which is designed to satisfy the requirements of data transmission in areas of smart grid (IEC 61850-3, IEEE 1613), transportation (EN50121-4), energy and industrial automation. The design enables maximum flexibility among electrical, SFP and GE combo interfaces. It supports up to 4GE uplinks and 4GE downlinks. Network redundancy and reliability are guaranteed with LACP, G.8032 ERPS (<50ms switch-over time).

Gazelle S1010i

Gazelle S1020i

Gazelle S1112i-PWR

Gazelle S1508i

Gazelle S1508i-PWR

P/N	Gazelle S1010i	Gazelle S1020i	Gazelle S1112i-PWR	Gazelle S1508i	Gazelle S1508i-PWR
100/1000M Base-X SFP ports	3 ports	4 ports		2 ports	
10/100/1000M Base-TX ports	N/A			4 ports	
10/100M Base-TX ports	7 ports	16 ports	8 ports	N/A	
GE Combo ports	N/A			2 ports	N/A
POE	N/A		4 x 802.3at or 8 x 802.3af	N/A	4 x 802.3at or 4 x 802.3af
DHCP	DHCP client, snooping and option82				
Protection	STP/RSTP/MSTP for network redundancy with a switch-over time less than 50ms, LACP 802,3ad				
VLAN, QinQ and QoS	Supported				
OAM	802.3ah				
Multicast	IGMP, MVR				
Temp Range	- 40 to 85˚C		- 40 to 75˚C	- 40 to 85˚C	- 40 to 75˚C
IP Level	IP40				
Installation	DIN-Rail, wall-mount, rack-mount				
Management	Erial Line Control, CLI, Telnet, SSHv2, Web Management and SNMP (NView compatible)				
MTBF	>35 Years				
Certification	IEC61850-3 and IEEE1613 compliant for Smart Grid EN50121-4 compliant for traffic transportation				

L2/L3 19" Full Gigabit Manageable Industrial Switch

Gazelle S5028i/S6028i/S6052i

The Gazelle S5028i/S6028i/S6052i is a full-gigabit L2/L3 rack-mounted manageable industrial switch is designed to satisfy the broadband backbone transportation and aggregation requirements under rigorous industrial and business conditions. The product employs a full modular design and supports a flexible electrical and SFP optical interface with combinations of up to 4 x 10GE/GE uplinks and 48 x GE downlinks. The S5028i/S6028i/S6052i enables maximum flexibility when configuring daisy-chain, ring, intersect ring and tangent ring topologies, and ensures sub-50ms switchover time. Enhanced security is provided by supporting IEEE802.1x, RADIUS and other authentication methods. The Gazelle S5028i/S6028i/S6052i can sustain high performance in extreme environments and operates normally over a wide temperature range from -40 to 85˚C. It also claims a fanless design, as well as IP40 dust protection housing, a redundant power supply, and is compliant with IEC 61850-3, IEEE 1613 and EN50121-4.

Gazelle S5028i/S6028i

Gazelle S6052i

Features/Device List	Gazelle S5028i	Gazelle S6028i	Gazelle S6052i
Uplink Slots	2 x GE uplink slots of 2 x 10/100/1000M Base-TX or 2 x 10GE/GE SFP ports	2 x GE uplink slots of 2 x 10/100/1000M Base-TX or 2 x 10GE/GE SFP ports	4 x 10GE/GE SFP ports
Downlink Slots	6 x GE downlink slots of 4 x 10/100/1000M Base-TX or 4 x GE SFP ports	6 x GE downlink slots of 4 x 10/100/1000M Base-TX or 4 x GE SFP ports	24 x 10/100/1000M Base-TX ports, 6 x GE downlink slots of 4 x 10/100/1000M Base-TX or 4 x GE SFP ports
Routing	N/A	Static routing, RIP, OSPF, VRRP	
VLAN, QinQ and QoS	Supported		
Protection	ISTP/RSTP/MSTP and G.8032 for network redundancy with a switch-over time less than 50ms, LACP 802.3ad		
Multicast	IGMP, MVR		
DHCP	DHCP client, snooping and option82		
OAM	IEEE802.3ah		
Temp Range	-40˚C to 85˚C		
IP Level	IP40		
Installation	Rack-mount		
Management	Serial control platform, CLI, Telnet, Web management, and SNMP (NView compatible)		
MTBF	>35 Years		
Certification	IEC61850-3 and IEEE1613 compliant		

L2 Manageable EN50155 Industrial Switch

Gazelle S1210i/S1218i-PWR

The Gazelle S1210i is an L2 DIN rail manageable EN50155 industrial switch designed to satisfy the requirements of data transmission specifically in the field of railway transportation. Gazelle S1210i supports up to 2 GE uplinks and 8/16/24 FE downlinks with an M12 connector. Gazelle S1218i-PWR supports up to 2 GE uplinks and up to 6 GE downlinks with an M12 connector. The Gazelle S1218i-PWR supports POE function with 2 IEEE802.3at ports or 4 IEEE802.3af ports. Gazelle S1210i/1218i-PWR also claims a fanless design with a protection of up to IP67 and a redundant power supply. The network redundancy and reliability are guaranteed with LACP, G.8032 ERPS (sub-30ms switchover time), and a 24VDC power supply.

Gazelle S1210i/S1218i-PWR

FEATURES

- Available with 2 x 100/1000M Base-FX optical ports and 8/16/24 x 10/100M Base-TX electrical ports
- Wide operating temperature range: -40 to 85˚C
- IP67 protection level

- Rugged DIN -rail design
- Supports DHCP client, snooping and option82
- Supports STP/RSTP/MSTP and G.8032 for network redundancy with sub-30ms switch-over time
- Supports VLAN, QinQ and QoS
- Supports IEEE802.3ah OAM
- Supports IGMP and MVR for multicast traffic
- Supports IEEE802.3ad LACP for optimum bandwidth utilization
- CLI, Telnet and SNMP (NView compatible)
- IEC61850-3 and IEEE1613 for smart grid applications
- EN50155 compliant for transportation applications
- DIN rail, wall mounting and rack mounting installation
- MTBF >35 Years

DIN Rail 3G/4G Router

Gazelle R102i/R202i/R202i-VM

The Raisecom Gazelle R102i/R202i/R202i-VM provides solutions that satisfy the requirements for SME and outdoor networking deployment scenarios, such as financial industry, environmental protection, transportation, postal industry, monitoring, military, meteorology, utility and residential areas.

The Gazelle R102i/R202i/R202i-VM allows up to 4 Ethernet-based devices to simultaneously use a single cellular data account for primary or backup network connectivity to remote sites and devices. By integrating routers, switches, firewalls, VPN, and 3G/4G in one single device, the Gazelle series provides the high performance, which is essential for concurrent services, including firewall, content filtering, encryption for VPNs, cellular data for mobility, data storage with USB 2.0, and quality-of-service (QoS) features for optimizing voice and video applications at broadband speeds. The use of this device significantly reduces both equipment and management costs.

Gazelle R102i

Gazelle R202i

Gazelle R202i-VM

Features/Device List	Gazelle R102i	Gazelle R202i	Gazelle R202i-VM
10/100/1000M Base-TX ports	N/A	2 ports	1 port
10/100M Base-TX ports	4 ports	N/A	4 ports
3G Uplink	WCDMA/CDMA2000 compatible		
4G Uplink	N/A	FDD/TD-LTE compatible	FDD/TD-LTE compatible(dual 4G modules)
Serial Interfaces	RS232/485/422 (DB9)		N/A
USB2.0	N/A	Supported	N/A
Wi-Fi	N/A	802.11b/g/n	
Security	IPSec and L2TP VPN, Anti-DoS, Anti-ARP, Anti-Scanning		
Routing	Static routing, RIP, OSPF		
Function	IGMP Proxy/Snooping, PPPoE, NAT NAT/PAT, DHCP and DNS/DDNS, DMZ function		
Temp Range	-25˚C to 70˚C		
IP Level	IP40		
Installation	DIN-Rail, wall-mount, rack-mount		
Management	Serial control platform, CLI, Telnet, Web management and SNMP (NView compatible)		
MTBF	>35 Years		
Certification	IEC61850-3 and IEEE1613 compliant		

Chapter 8. PCM for SCADA

The Raisecom PCM for SCADA has been especially designed for utility, industry, transportation and military application projects where special requirements are required to be fulfilled for mission-critical data and voice traffic. In addition, PCM helps users benefit significantly from maximum network extendibility over existing network infrastructures. The central platform RC3000-15/6, also known as the Multi-Service chassis, delivers and integrates narrowband and broadband services transmitted by the RC3000E at the remote side. A complete modular design allows providers to benefit from maximum flexibility to achieve specific requirements and goals, while keeping their Total Cost of Ownership (TCO) under control. The Raisecom SCADA solution is well known for its robustness and reliability in access networks. This solution is gaining its popularity in the following industries: power grid, water and natural gas, oil, mining and national security, public health and transportation.

Multi-Service Chassis

RC3000-15

The Raisecom RC3000-15 is an intelligent multi-service access platform and is mainly applicable in dedicated networks and in Utilities and Transportation transport networks. The device is a Digital Access and Cross-connect System (DACS), which integrates the following functions: digital/analog access, cross-connection and transmission. RC3000-15 is compatible with the Multi-Service Terminal Mux and can be synthesized under the Raisecom NView system for real-time configuration, management, monitoring and trapping.

RC3000-15

FEATURES

- Available with 4 x STM-1 and 2 x GE at line side; 7U chassis with 15 slots
- Supports non-blocking cross-connect of up to 4096 DS0 channels
- Supports EOS
- Supports one-plus-one protection over STM-1 optical interface
- Available with sub-cards supporting electrical/optical E1, FE, FXS, FXO, 2/4W E&M, magneto, hotline, dry contact, co-directional 64K, V.35, V.24, RS232, RS422, RS485 at client side
- Configurable E1 interface gain mode to expand transmission distance
- Supports a software configurable attenuation of each TX/RX channel with increments of 0.1dB for voice modules
- Supports Link Capacity Adjustment Scheme (LCAS) for inverse multiplex modules
- DXC module supports alarm input and output, external clock supports 2Mbps and 2MHz
- All sub-cards hot-swappable
- Supports one-plus-one protection over E1 and PSU/DXC cards
- Power supply and fan modules with monitor
- Supports Auto Laser Shutdown (ALS) and Build-in BERT
- Supports inside and outside loopback for individual tributary cards
- Supports VCC channel for remote network management
- SNMP (NView compatible) via in-band and out-of-band network channels

P/N	RC3000-15
Size/slot	7U/15-slot
Cross connect	512 Mbps
STM-1 interface	4
E1 channel	88
FXS/FXO channel	352
E&M channel	176
V.35 channel	88
V.24 channel	88
RS232 channel	176
FE port	88
Magnet interface	120

System and Sub-cards

- RC3000-15-A, 7U/15-slot chassis with ventilation modules only
- RC3000-15-DXC, system management & Control Card
- SUB-BITS-CLK, insert on the DXC card to provide 2Mbit and 2MHz external clock function
- RC3000-15-STM1, SDH aggregated unit with two STM-1 optical interfaces with SFP connector, 4 FE interfaces and 4 E1 unbalanced or balanced interfaces with DB37 connector.
- RC3000-15-8E1, E1 tributary unit with 8E1 unbalanced or balanced interfaces, support one-plus-one port/card protection
- RC3000-15-P240-4FE-OPT-S1, PDH tributary unit with dual optical interfaces for redundancy and 4 FE interfaces and 8 E1s transmission capacity
- RC3000-15-32FXS, 2-wire Foreign Exchange Subscriber(FXS) interface card, 32 interfaces per card, DB37 connector
- RC3000-15-32FXO, 2-wire Foreign Exchange Office(FXO) interface card, 32 interfaces per card, DB37 connector
- RC3000-15-8S8O, 2-wireFXS and FXO interface card, 8-channel FXS and 8-channel FXO interfaces per card, DB37 connector.
- RC3000-15-16E&M, 2/4wire E&M interface card, 16 interfaces per card, HDB26 connector
- RC3000-15-8ETHP, High speed Ethernet interface card, which provides 8 channels 10/100 Base-T Ethernet port, data rate: N×64Kbps (N=1~31)
- RC3000-15-8RS232H, low speed RS232 data interface card with handshaking, up to 57.6Kbps RS232, 8 interfaces per card with RJ45 connector
- RC3000-15-8RS485, low speed RS485/RS422 data interface card, up to 38.4Kbps RS485/RS422 data, 8 interfaces per card with RJ45 connector
- RC3000-15-8V35, high speed V.35 synchronous data interface card, 8 interfaces per card, user selectable data rate N × 64Kbps of "N" (1~31)
- RC3000-15-8V24H, low speed V.24 data interface card with handshaking, up to 128Kbps V.24 synchronous data 8 interfaces per card
- RC3000-15-16C64K, G.703 Co-directional of 64Kbps data interface card, 16 interfaces per card, RJ45 connector

Multi-Service Terminal Mux

RC3000E

RC3000E is a standalone multi-service terminal mux that uses E1 circuit resources in order to provide digital and analog accesses, multiplexing, voice and data cross-connections and transmissions. The product can be deployed in a variety of network topologies, such as point-to-point, chain, star and mesh. The 1U compact device also utilizes a wide range of interfaces for narrowband and broadband access.

RC3000E

FEATURES

- Available with 1 uplink slot and 3 downlink slots
- Supports non-blocking cross-connect of up to 512 DS0 channels
- Available with uplink card 4/8 channels electrical E1 or optical E1+FE interface
- Available with sub-cards supporting FXS/FXO, E&M, V.24, RS232, RS422, RS485, V.35, G.703 co-directional 64K and 10/100M Base-T Ethernet at the client side
- Supports one-plus-one protection over electrical E1 interfaces and PSU cards
- Hot-swappable for all sub-cards
- Supports built-in BERT
- Remote configuration control and performance monitoring
- Software configuration alarm output function
- Supports CLI , Telnet and SNMP (NView compatible)

Chapter 9. Ethernet over Everything

Ethernet is the dominant technology for Local Area Networks (LANs). Due to its inherent efficiencies, it is now being widely deployed in metropolitan and Wide Area Networks (WANs). This trend will continue due to increased bandwidth requirements, convergence, migration to 4G networks and triple-play services.

By working with world major carriers, utilizing our industry expertise and committing significant resources, Raisecom has developed a set of access technologies to deliver Carrier Ethernet services over existing network infrastructures, such as traditional TDM networks, dark fiber and twisted pairs.

Beyond the Metro network, the Ethernet services now offered are not only limited to cities or national borders, they extend to multiple providers globally. Following this trend, a new concept of wholesale demarcation has emerged, requiring a series of technologies to deliver Ethernet services over different existing infrastructures and emphasizing the deployment of universal end-to-end QoS. This enables increasing service performance visibility between wholesale terminals and service providers. Similar solutions are provided in Raisecom Ethernet over PDH/SDH and Ethernet over G.SDHSL product lines. Raisecom access devices enable service providers to benefit from full OAM capabilities, effectively deploying and supporting new services and a managed SLA commitment.

Ethernet over Fiber

RC552-FE, RC552-GE

RC552-FE and RC552-GE are carrier-grade media converters designed for business access scenarios. The series is becoming one of the bestsellers in the Raisecom product portfolio due to its powerful packet forwarding, ability, advanced 802.3ah OAM features and redundancy and reliability enabled by 1:1 dual-homing uplink protection at both port and system levels. As a traditional media converter, this series not only supports point-to-point scenarios but also can be deployed in point-to-multipoint cases. Installed in the Raisecom RC002 chassis, the device can be managed by the Raisecom NView NNM system via the SNMP agent. It also supports a web management that eases remote troubleshooting and maintenance.

RC552-FE

RC552-GE

P/N	RC552-FE	RC552-GE
Client side	1 x 10/100M Base-T	1 x 10/100/1000M Base-T
Line side	2 x 100M Base-FX SFP	2 x 1000M Base-X SFP
Protection	1:1 uplink protection	
VLAN, QinQ	Supported	
OAM	802.3ah	
Rate limit	Supported	
Fault pass through	Fault pass through	
Certification	MEF9, 14	
Management	Web Management and SNMP (Nview compatible)	

Ethernet over PDH

RC959-GESTM1, RC959-4FE16E1, RC953-4FExE1T1, RC951E-4FEE1

The RC959 series is a standard GFP-encapsulation EoPDH aggregator used for delivering segregated Ethernet services over existing legacy networks. It meets customer requirements in terms of advanced Ethernet switching and diagnostics containing full L2 switching functionality and standard Ethernet OAM/CFM features. The flexible RC959-4FE16E1(-BL) can act both as an aggregator and/or a remote demarcation in point-to-point and point-to-multipoint topologies. By comparison, RC959-GESTM1 is only deployed at the POP site operated by service providers and is used for aggregating services from remote demarcation, such as the RC951E-4FEE1, RC953-4FExE1T1 series and RC959-4FE16E1(-BL). Both models allow carriers to offer flexible service channels from 2Mbps to 32Mbps, under protection enabled by LCAS from unexpected E1 link failures. As Ethernet Demarcation Devices (EDD) with 4 x FE at the client side, the RC951E-4FEE1 and RC953-4FExE1T1 can support up to 1xE1 and 4/8xE1 at the line side, respectively. They also include advanced OAM and network diagnostic features in addition to L2 switch functionality. The series can be deployed in point-to-point scenarios, as well as working with non-Raisecom aggregation gateway, building a customized Ethernet service channel over existing PDH/SDH networks owned by Carriers. Standardized GFP encapsulations assure outstanding interoperability and a broader field of applications.

RC953-4FExE1T1

RC959-4FE16E1

RC959-GESTM1

P/N	RC959-GESTM1	RC959-4FE16E1	RC953-4FExE1T1	RC951E-4FEE1
Client side	2 x STM1	16 x E1	4/8 x E1	1 x E1
Line side	2 x GE	4 x FE and 1 x GE	4 x FE	4 x FE
Encapsulation	GFP		GFP/HDLC	
VLAN, QinQ, QoS	VLAN, QinQ, QoS, Ingress rate limit, Egress traffic shaping			
OAM	802.3ah, 802.1ag, Y.1731/SLA			
Resiliency	VCAT, LCAS, error status monitoring, link diagnostic			
Management	Serial Line Control, CLI, Telnet and SNMP (NView compatible)			

Ethernet over Copper (SHDSL.bis)

RC1108-SHDSL-2Wx8, RC1104

The RC1108 is a SHDSL.bis aggregation module compatible with the iTN2100, OPCOM3500E and RC3000-15 chassis. By supporting TC-PAM128 technology, it can deliver symmetrical data of up to 15Mbps per 2-wire. This module allows for the transmission of E1 and FE services over STM1/4 or Metro Ethernet through a copper cable, and fulfills the need for both bandwidth and permanent data connections. The RC1104 series are SHDSL CPEs, which can extend the transmission of E1 and/or Ethernet services over 4-wire copper, enabling service providers to deliver cost-effective broadband access and leased-line services. Powered by TC-PAM128 technology and EFM-bonding, symmetrical data services can be offered at the rate of up to 15Mbps per pair of wires, enabling a maximum transmission distance of 2.6km (under lab conditions) through 0.4mm 2-wire copper cable. The RC1104 is mainly used to extend Ethernet or E1 service cost effectively, and is perfect for fast deployment of massive units. RC1104 devices can work in pairs or can be aggregated by the RC1108. By employing the integrated Raisecom NView system, carriers can effectively configure parameters and monitor performance using the graphic user interface (GUI) integrated in all the devices.

RC1108-SHDSL-2Wx8

RC1104

P/N	RC1108-SHDSL-2Wx8	RC1104
Client side	1 x GE	1 x FE/E1/V.35
Line side	8/16-wire SHDSL	2/4-wire SHDSL
VLAN, QinQ, QoS	Supported	N/A
OAM, SLA	802.1ag, 802.3ah, Y.1731, SLA	
E1 mode	Framed/unframed	
Bonding	EFM bounding	
Resiliency	Fault pass through, flow control, storm control	
Management	CLI, Telnet and SNMP (NView compatible)	

Chapter 10. Multi-Service Last Mile Access

The Raisecom product line for multi-service last mile access offers extensive flexibility and robustness for diversified data and voice applications at a reasonable cost, minimum deployment efforts and optimized administration, management and operation. The subcategories include Raisecom's best-selling mini-SDH, interface converter, fiber optical modem, FiberMux and multi-service modem pool and chassis.

SDH ADM

OPCOM3107-16E1-BL

Compactness, cost-effectiveness and versatility characterize the OPCOM3107, which is ideally suited for voice and data transmission. Services provided range from traditional E1 to new ones, such as Fast Ethernet. The OPCOM3107 supports 16 fixed E1 ports, 4 Fast Ethernet ports and 1 GE combo port. It also provides one alarm terminal and a 2Mbit/2MHz external clock connector. For Ethernet over SDH services, the OPCOM3107 uses a standard Generic Framing Protocol (GFP) mapping, Link Access Procedure SDH (LAPS) Virtual Concatenation and Link Capacity Adjustment Schemes (LCAS) for dynamic bandwidth allocation. All these features enable the OPCOM3107 to be considered the next-generation STM-1 access device.

OPCOM3107-16E1-BL

FEATURES

- Available with 2 x STM-1 & 16 x E1 interfaces in balanced mode, 4 x RJ45 Fast Ethernet and 1 x combo GE interface
- Available with 2Mbit/2MHz external clock and 1 alarm input and output interface
- Popular as a NG access device playing aggregation, add-and-drop multiplexer (ADM) and/or Terminal multiplexer (TM) roles in STM-1 ring or daisy chain topology
- Supports hybrid cross-connection between VC3 and VC12
- Supports GFP/LAPS encapsulation, VCAT and LCAS function
- Supports VLAN, QinQ, QOS, ACL, rate limit, mirror and storm control
- Supports one-plus-one MSP, one-plus-one LPP and redundant power supply
- Supports retiming on the 1st to 4th E1 channels
- Supports ALS, LPR
- Supports local/remote online upgrade and management
- CLI and SNMP (NView compatible) via in-band and out-of-band network channels

Fiber Optical Transmission Device

RC802-DS3/E3

The RC802-DS3/E3 is an optical fiber transmission device designed to transmit DS3 or E3 services over fiber. It contains one SFP optical port for uplink and one BNC interface for downlink that can be configured to DS3 or E3, using the DIP-switch. This modular device operates in the Raisecom RC001/002 series chassis where it can be locally managed using the SNMP agent and can be remotely managed when working in conjunction with the iTN2100 on the Raisecom NView NNM system.

RC802-DS3/E3

FEATURES

- Supports DDMI for SFP fiber uplink
- Supports local/remote loopback on the fiber port and local loopback on a DS3/E3 port
- Supports in-built bit error tester to assist fault location
- Supports ALS on a fiber port
- Supports remote power-off alarm in point-to-point topology
- Local SNMP management in RC001/002 series chassis and remote SNMP management when working in conjunction with iTN2100

Fiber Optical Modem

RC862-30-BL, RC862-30-FV35

The RC862-30 series is designed to transmit one link of E1 or V.35 service over fiber optic. The RC862-30-BL provides one fiber optic uplink and one E1 link on the customer side, while the RC862-30-FV35 provides one fiber optic uplink and one V.35 interface on the customer side. The devices are usually deployed in point-to-point topology, RC862-30-BL with RC862-30-BL, RC862-30-BL with RC862-30-FV35, or RC862-30-FV35 with RC862-30-FV35. These modules operate in the RC001/002 series chassis, and can be locally and remotely managed via the GUI of the Raisecom NView NNM system.

RC862-30-BL

RC862-30-FV35

P/N	RC862-30-BL	RC862-30-FV35
Client side	1 x E1	1 x V.35
Line side	1 x optical interface	
E1 mode	Framed/unframed	
Loopback	Local/remote	
Clock	Master/slave	Master/slave/V.35 terminal clock
Alarm	Remote power off alarm	
Inner bit error tester	Supported	
Management	CLI, Telnet and SNMP (NView compatible)	

Multi-Service FiberMux

RCMS2902-60FE-BL, RCMS2912-4(8)E1T1GE, RCMS2903-4E1-4GE, RCMS2911-16E1-4GE-BL

RCMS2902-60FE-BL

RCMS2912-4(8)E1T1GE

RCMS2903-4E1-4GE

RCMS2911-16E1-4GE-BL

The RCMS2900 series is a multi-service Fibermux, designed mainly for scenarios of small or medium enterprise access and 2G/3G mobile backhaul. The RCMS2902-60FE-BL and RCMS2912-4(8)E1T1GE are modular devices that can work in RC001/2 series chassis supporting both local and remote management via NMS. The RCMS2903-4E1-4GE and RCMS2911-16E1-4GE-BL are standalone, multi-service Fibermux. The latter can support up to 16E1, as well as offer one-plus-one protection redundancy for uplinks. The RCMS 2900 series is typically used for point-to-point scenarios, or aggregated by a iTN2100 multi-service access platform.

P/N	RCMS2902-60FE-BL	RCMS2912-4(8)E1T1GE	RCMS2903-4E1-4GE	RCMS2911-16E1-4GE-BL
Client side	2 x E1+1 x FE	4/8 x E1/T1 + GE	4 x E1 + 4 x GE	16E1 + 4 x GE
Line side	1 x F.O. interface	2 x F.O. interfaces (1+1 protection)	1 x F.O. interface	2 x F.O. interfaces (1+1 protection)
Loopback	Local/remote loopback			
MTU	1,916 Bytes	9,728 bytes	9,720 bytes	9,600 Bytes
VLAN, QinQ, QoS	N/A		Supported	
Switching mode	N/A			Supported
Rate limit	Supported			
Flow control	Supported			
Alarm	Remote power off alarm			
Inner bit error tester	Supported			
Fault pass through	Supported			
Management	CLI, Telnet and SNMP (NView compatible)		Serial Line Control, CLI, Telnet and SNMP (NView compatible)	

Multi-Service Modem Pool

RC002-16

The RC002-16 is a 19" 3U height rack-mountable chassis, in which up to 16 service modules can be installed. It provides a CO/POP site solution for connecting up to 16 remote customers. The chassis is SNMP manageable with an SNMP agent module, which takes up one of the sixteen slots. Each service module in the RC002-16 operates in a point-to-point topology with a remote unit. The two devices work independently, and do not influence the operation and management of the other modules in the same chassis. All modules, including the SNMP agent module, are hot-swappable. One AC or DC power supply module is able to support a full chassis of service modules regardless of service types. The RC002-16 can use two power supply modules to provide a redundant and flexible power supply solution for the customers. When working with the SNMP agent module RC002-NMS1, all the service modules in the RC002-16 can be network managed on the GUI of the Raisecom NView NNM system.

RC002-16

FEATURES

- Rack-mountable 3U chassis for housing and network management of up to 15 service cards
- Supports 16 slots of plug-in cards including RC002-NMS1/RC001-NMS2 as SNMP agent
- Supports flexible and redundant power supply modules
- Supports a cascade up to 4 chassis with maximum management capacity of 60 pairs of service cards
- Rack-mountable 3U chassis for housing and network management of up to 15 service cards
- Supports 16 slots of plug-in cards including RC002-NMS1/RC001-NMS2 as SNMP agent
- Supports flexible and redundant power supply modules
- Supports a cascade of up to 4 chassis with maximum management capacity of 60 pairs of service cards

Single/Double-Slot Chassis

RC001-1, RC001-1M, RC001-1D, RC001-2D, RC001-2M

RC001 single and double slots chassis series is designed for telecom carrier and important enterprise users in the fields of finance, electric power, oil and gas industries. When fixed into a RC001 chassis, the modular media converters, Fiber Modem, Multi-service FiberMux, interface converters, CWDM, G.SHDSL modems and other modules, which are all designed for 1U slot, become stand-alone and network-manageable equipment.

The built in SNMP agent module of the RC001 provides network management function, such as configuration management, diagnostics, loop activation, monitoring and fault management. There is one console port, one Ethernet port and 1/2 slot for modular device on the front panel. The AC and DC power supply connectors on the rear panel of the chassis provide users with the flexibility of using an AC power supply, a DC power supply, or both.

RC001-1D

RC001-1

RC001-2D

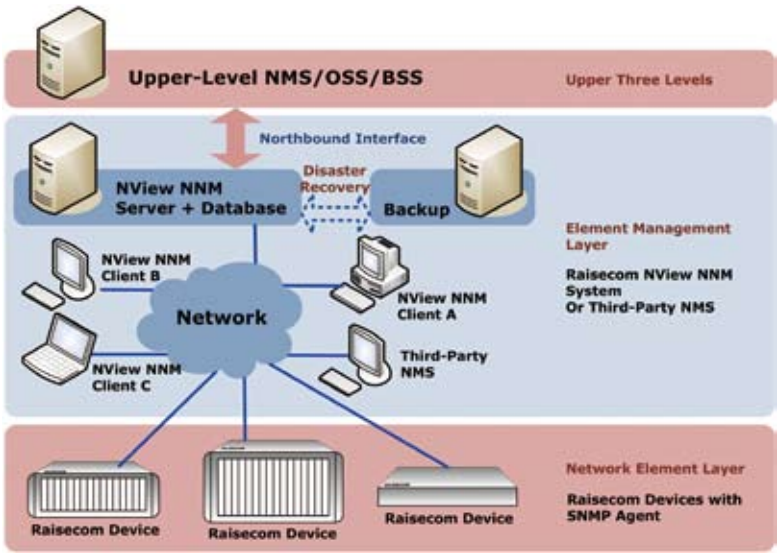
RC001-2M

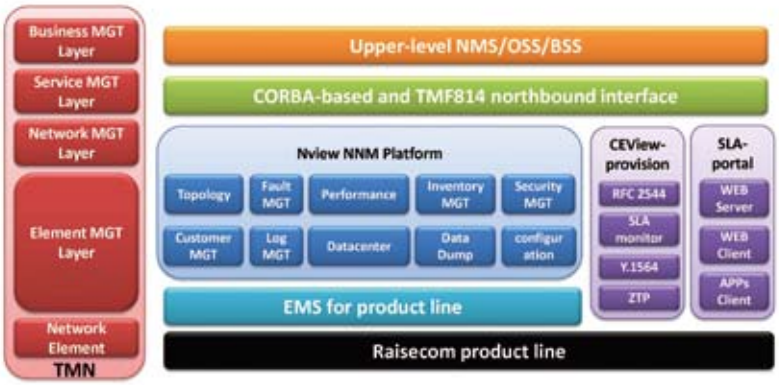
RC001-1M

P/N	RC001-1	RC001-1M	RC001-1D	RC001-2D	RC001-2M
Size/Slot	1U/1-slot	1U/1-slot	2U/1-slot	2U/2-slot or 2U/1-slot	
Power supply	AC/DC/WP	Single/dual AC Single/dual DC Single/dual WP, AC+DC	AC/DC/WP	Single/dual AC Single/dual DC Single/dual WP, AC + DC	
Power protection	Overcurrent/short circuit protection	Overcurrent/short circuit/overheat protection	Overcurrent/short circuit protection	Overcurrent/short circuit/overheat protection	
Management	Remote CLI, Telnet and SNMP (NView compatible)	Serial Line Control, Local/remote CLI, Telnet and SNMP (NView compatible)	Remote CLI, Telnet and SNMP (NView compatible)		Serial Line Control, Local/remote CLI, Telnet and SNMP (NView compatible)

Chapter 11. Network Management System

The ultimate aim of developing a network management system is to maximize the network efficiency and minimize its downtime at the system level. As a telecommunication equipment vendor focusing on the access network, Raisecom aspires to design a network management system (NMS) that will manage not only just any Raisecom devices, but also all the networks built by them. The Raisecom Network Management System NView NNM covers the two lowest layers of the TMN architecture. Since its design is based on the FCAPS model, this software includes fault, configuration, performance and security management functions. A northbound interface is also available on the system for the integration of network management systems, implementing full FCAPS functions on the last three levels of the TMN architecture.





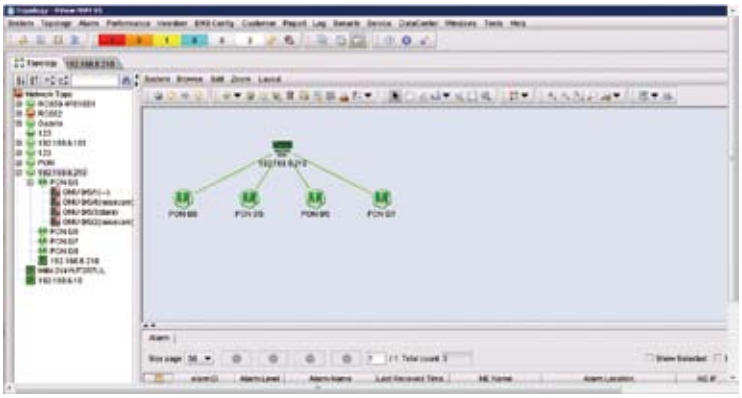
The Raisecom NView NNM system is a Client/Server structured system, in which several Clients can work with only one Server to ensure efficient device monitoring and managing. All Raisecom network manageable products include built-in SNMP agents allowing them to communicate with Element Management Systems (EMS). They also integrate a uniform platform consisting of topology, inventory, configuration, customer, fault, performance and security management components to administer all equipment in the network in one topology. Third-party NMSs can directly manage Raisecom network manageable devices by using Raisecom MIBs. In addition, upper-level NMS/OSS/BSS can share data and results on the NView NNM system through the northbound interface. The system also provides a disaster recovery solution, protecting the server from fatal disasters and ensuring continuous running of the system by setting up a backup server and keeping it constantly synchronized with the main one.

Topology Management

The Raisecom NView NNM system displays all the graphic networks elements and links. Dynamic network status indicators and alarms are displayed according to port, card, device, sub-network and network topology, facilitating monitoring and directing the users clearly to the relevant information.

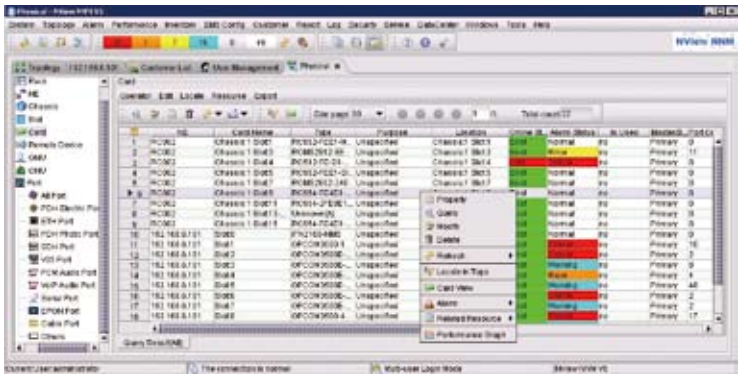
- Multi-level topology displaying
- Manual or automatic topology arrangement
- Device node auto-discovery mechanism
- Device sub-graph auto-drawing mechanism
- Network topology pre-planning mechanism

- Clear indication of current alarm status and device offline status
- Quick location of point of failure in the network
- Topology style customization



Inventory Management

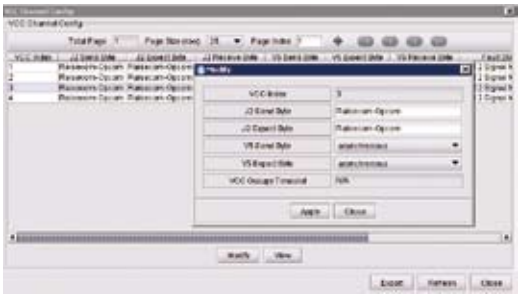
All resource-related information is displayed from different viewpoints in the inventory management module to assist network operators to manage resources uniformly and to provide a reliable basis for further network expansion.



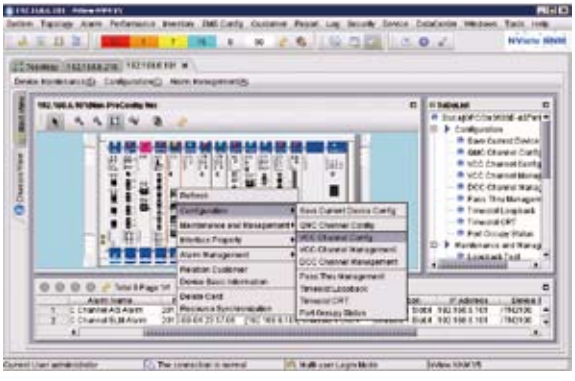
- Unified management tool for resources, such as devices, chassis, slots, cards, and ports
- Comprehensive resource description, including customer and fault information
- Uniform query platform for rapid search of resources
- Synchronization mechanism that guarantees the system showing real-time status of network resources

Configuration Management

Configurations can be distributed to devices across the network; easy management and provisioning is provided by a user-friendly point-and-click GUI with a realistic representation of devices.

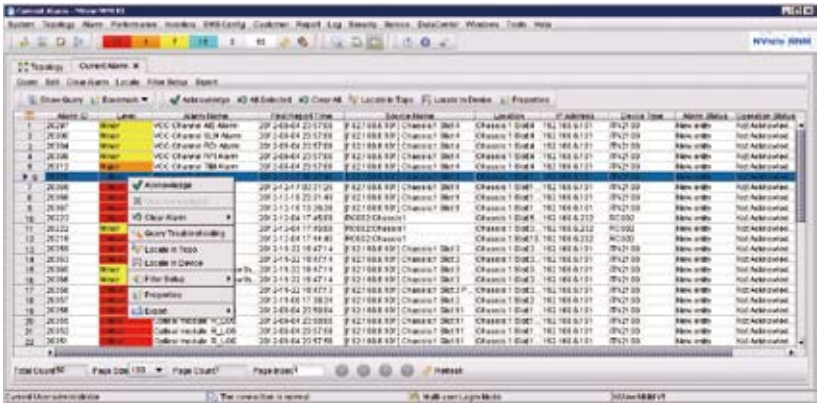


- Uniform platform for different EMS, different devices share topology, resource, fault, performance, security functions
- User-friendly device status displayed on device panels drawn by EMS
- Real-time status feedback for every device configuration
- Data center provided for centralized management of firmware upgrade and configuration file upload/download
- Batch configuration of SNMP parameters
- Zero configuration mechanism



Fault Management

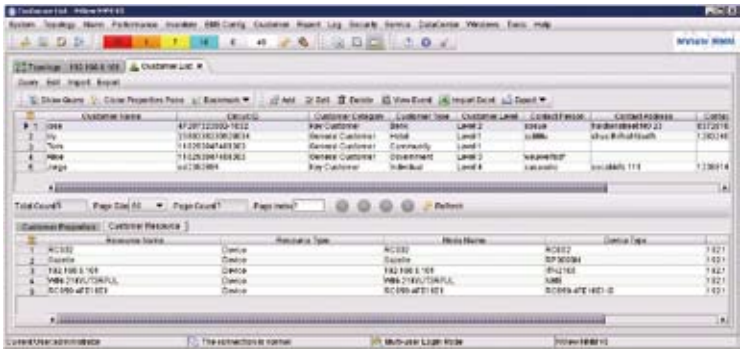
The Raisecom NView NNM system supports advanced fault detection and analysis functions, and realizes real-time monitoring and timely fault reporting. Full-scale alarm management information, such as alarm statistics, alarm location, alarm status, etc. helps the network operator restore devices to their original working configuration when necessary.



- Standard five-level alarm display
- Separate lists for current and historical alarm management
- Grouped alarm monitoring interface defined according to customer requirements
- Customized alarm filter rules that allow display of events in order of importance
- Automatic alarm lists clearing service
- Alarm forward service that forwards alarms received on NView NNM to third-party platforms via SNMP
- Alarm locating and troubleshooting library to ensure quick and easy fault removal

Customer Management

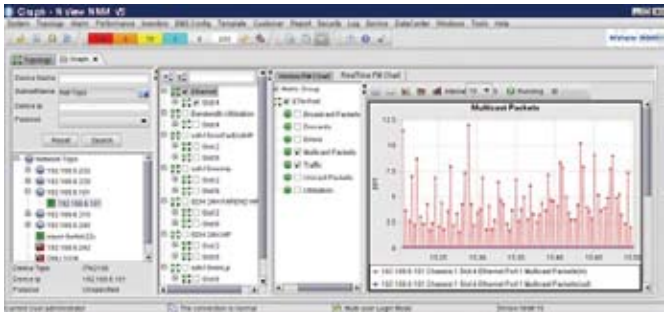
The Customer Management module establishes the correlation between devices and customers to ensure efficient handling of information, particularly in the event of abnormal operation, when it is essential to quickly establish which customer is in need of troubleshooting.



- Centralized customer information management
- Customer-based resource management
- Customer-based fault management
- Import and export of customer information

Performance Management

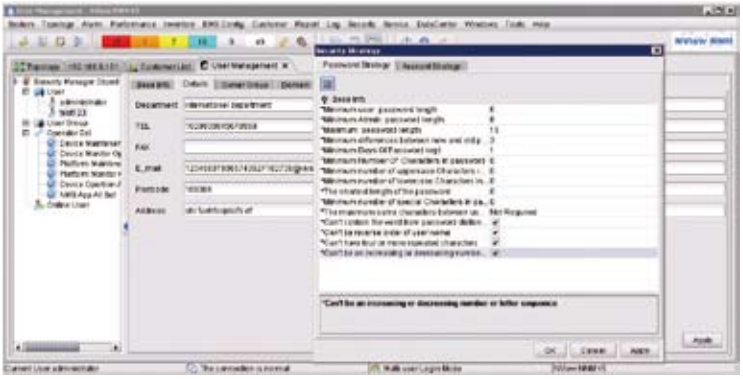
The NView NNM performance management function supports real-time monitoring of the SDH and Ethernet service performances to produce real-time, as well as historical statistics for different periods. It also provides the basis for troubleshooting, fault speculation and network optimization.



- Uniform performance management system for all devices under management
- Tailored deployment for network of different capacity
- Monitor device CPU and RAM utilization
- Collect PON/Ethernet/UNI/SDH port current and historical performance data
- Performance graph based on performance data collected
- Performance data export
- Actual performance metrics based on ITU-T Y.1731/SLA
- Metric template management

Security Management

A number of user profiles and groups can be created in the security management module, but only authorized users are allowed to login to the NView NNM system and to operate it. This function protects all information on the system against illegal access, unauthorized use and other hazards.



- Multi-domain multi-authority management
- Different user profiles have different read and/or write authorities over devices in different subnets
- Client access control mechanism
- Unauthorized login deny mechanism
- Maintains system and device operation logs and supports log export

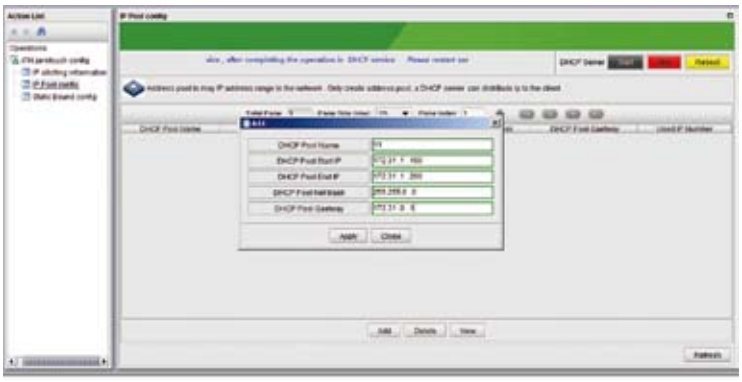
Web Management

Web management can help network operators to manage devices based on GUI interface via a web browser. It supports user management, configuration management, traffic statistics and devices status monitor. Combined with Raisecom NView NNM system, it also can realize fault management. All these functions can minimize overall operating costs and reduce provisioning times.

- User-friendly, intuitive graphical configuration interface
- Operator authorization levels
- Unauthorized login deny mechanism
- Synchronization mechanism ensures real-time status update of the devices

Zero Touch Provisioning

In modern Carrier Ethernet networks providers must consider a cross-functional automation that efficiently integrates commissioning, activation, inventory, fault, performance and network management. The challenging combination of the above capabilities is much needed for ensuring prompt new services launching, highly scalable network, effortless equipment roll-out and highest maintenance. Obviously, to achieve such level of automation, providers require an accurate and granular performance monitoring mechanism, combined with a fully-automated activation system.



Zero touch provisioning allows service-providers to facilitate remote devices automatically without manual intervention. When remote devices are physically connected to the network and booted, the initial management IP can be automatically distributed to remote devices based on DHCP. Then, configurations and software updates can be automatically loaded into remote devices via a service template to simply deployment and minimize human errors.

This mechanism ensures lean TCO and hence guarantees the modernization of packet networks.

- Simplest procedure: Rack, connect and power on
- Diverse and editable service templates
- Topology auto-discovery mechanism
- Physical and logical graphic representation of links and nodes

NOTE

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